TOWN CREEK AQUEDUCT
HISTORIC STRUCTURES REPORT

Chesapeake and Ohio Canal

National Historic Park, Maryland

By

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LIST OF ILLUSTRATIONS

PREFACE FOR THE 2012 EDITION

At the time that Edwin Bearss completed this historic structure report (HSR), the canal from Seneca to Cumberland was a National Monument. In 1971 the canal lands become a National Historical Park, including both the upper canal and the lower 22 miles that had earlier been restored for recreational purposes by the CCC and declared a recreational waterway.

A major stabilization of the Town Creek Aqueduct was undertaken by the National Park Service in 1976–77, a decade after the HSR was completed. That project included the dismantling and reconstruction of the aqueduct's walls, grouting of voids, repointing all walls, grading the canal bed of the aqueduct, and repairing the towpath parapet. The berm parapet that had collapsed was not reconstructed.

It should be noted that the Historic American Engineering drawings and photographs, and the four later photographs have been added to the original HSR as submitted by Mr. Bearss.

Karen M. Gray
Headquarters Library Volunteer
Hagerstown, MD
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INTRODUCTION

The aqueduct over Town Creek, or Aqueduct No. 10 as it was designated while under construction, was destined to take many years to complete. Thirteen years were to pass from the time that the bid of Frederick Pratt to build Aqueduct No. 10 was accepted by the Board of Directors of the Chesapeake and Ohio Canal Company in September 1837, till the structure was declared ready for water. In fact, the Town Creek Aqueduct was the last major "work of art" on the canal to be accepted.

A study of the construction history of the Town Creek Aqueduct reveals to the historian the desperate financial plight of the Company, and the determination of its officials and friends to see the construction of the "Great National Project" completed as far as Cumberland.

CHAPTER I. PRATT AND HATCH START BUT FAIL TO COMPLETE AQUEDUCT NO. 10

On January 16, 1835, the Board of Directors of the Chesapeake and Ohio Canal Company determined to suspend the letting of all contracts along the line between the Cacapon River and Cumberland, except for the Tunnel and the heavy sections (Nos. 333 and 334) at Oldtown, until such time as adequate resources were secured to assure their early completion.[1]

With the receipt of the first installment of the $2,000,000 loan from the State of Maryland, work on the canal was resumed with increased vigor. The Company ordered the route from the Cacapon to Cumberland to be resurveyed for the purpose of making a final location of the line, preparatory to putting this last stretch of the eastern section of the canal under contract. The Board named one of its members, George Bender, to fill the newly established office of Commissioner, which it created to provide effective supervision of construction. The work had moved so far westward that it was now impossible for the Board, meeting in the District of Columbia, to maintain adequate control of operations. Commissioner Bender was given authority over the lesser officials, the acquisition of land, the use of company property and the re-letting of abandoned contracts.[2]

The extension of the canal from the Cacapon to Cumberland raised a new series of problems. Among the first of these was the resurveying of the line. Assistant Engineer Ellwood Morris was placed in charge of the survey. In accordance with his instructions from Chief Engineer Charles B. Fisk, Morris reconnoitered Town Creek in September 1835. His mission was to check into the possibility of damming Town Creek to provide water for the canal, when the Potomac was at a low stage. When he filed his report on September 15, Morris observed, Town Creek "is one of the most unfailing tributaries of the Potomac," its flow during a prolonged drought had been measured and found to be from three to five cubic feet per second. At such time, the Little Cacapon, Fifteenmile Creek, Sideling Hill Creek, and the Little and Great Tonoloway usually stopped running.

When he questioned Mr. Ash, who for the past ten years had operated a saw-and-gristmill at the mouth of Town Creek, Morris was delighted to learn that the stream seldom fell so low as not to operate his four waterwheels, "at least 6 hours out of the 24."

Long-time inhabitants of the area had told Morris that during the spring run-off, there were "many days when it was impossible to cross the creek at its mouth except in boats." After a heavy downpour, Town Creek had been known to rise ten feet in a few hours.

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1 Ingle to Bender, Jan. 16, 1835 (Ltrs. Sent, Records of the C & O Canal Co.): *Eighth Annual Report*, C & O Canal Co. (All manuscript source materials referred to in this report are deposited in the Department of the Interior files at the National Archives.)

2 *Proceedings of President and Board of Directors*, Book D, p. 342.

Morris, on studying the annual rainfall charts of the area drained by Town Creek, concluded that "during a portion of the year Town Creek renders into the Potomac a vast amount of water." By building a dam and impounding the winter's run-off, the Company could "have a fund to draw on in dry season, competent to feed 25 miles of canal." A dam of sufficient height to flood 300 acres to a depth of 38 feet would store enough water to "feed 25 miles of canal for 229 days, while a 320-acre pond with a depth of 40 feet could feed 25 miles of canal for 258 days." If a dam were to be built, Morris recommended that its spillway be 40 feet above the surface of the canal.[3]

Morris' scheme to dam Town Creek, however, was pigeon-holed by the Board of Directors in December as too costly.[4]

Meanwhile, Superintendent of Masonry, A, B, MacFarland, was dispatched by Fisk to inspect the area above Dam No. 5 to pinpoint prospective sources of "good building stone." As he ascended the Potomac Valley, MacFarland found much of the strata composed of friable red sandstone, much of it already rotten. Good building limestone was discovered at scattered points on both sides of the Potomac, but at some distance from the river. When MacFarland reconnoitered the slopes of Town Hill, he was "gratified to find that it contained stone nearly on the whole extent in the greatest abundance, and of the very best quality for cutting purposes."

The road network was also favorable, with the main road connecting Fifteenmile Creek and Oldtown running parallel to, and, at the base of, Town Hill for a distance of eight to ten miles. About one-half mile from this road on the southeast slope of the hill was a "continuous quarry." An examination of the sandstone found here indicated to MacFarland that it was of a "finer texture" than that located on Sideling Hill. Its color was "lightish-yellow," while it dressed easier than the Monocacy stone. MacFarland forecast that the Town Hill quarries would be the "most fertile and best discovery of stone we have made since commencement of the canal."[5]

Near Mrs. Harness' house, close to proposed Lock No. 68, MacFarland located three strata of limestone. This rock could be used for rubble masonry for the projected Town Creek Aqueduct.

Across the Potomac and about one mile from the mouth of the South Branch, MacFarland found on Valley Mountain a "solid but hard rock." On the western slope of Valley Mountain, about one and one-half miles from Oldtown, close to the Potomac on the property of James Taylor, he dis-

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[3] Morris to Fisk, Sept. 15, 1835 (Ltrs. Recd. By President & Directors 1835–1837). In his gristmill Ash employed two undershot wheels, while there were two flutter wheels in his sawmill. Ash's dam had 100 feet of water way, and the head and fall of the mill was 10 feet.

[4] Bender to Ingle, Dec. 6, 1835 (Ltrs. Recd., C & O Canal Co. Papers).

[5] The Cumberland—Hancock road , which skirted Town Hill, five miles west of the mouth of Fifteenmile Creek, would provide a feasible route for supplying the construction crews employed on Locks No. 58 to No. 67. MacFarland believed that the great advantage of the Town Hill quarries would be the downhill haul. A four-horse team should be able to pull from 25 to 30 cubic feet of stone to a load.

Stories that had heretofore circulated regarding the difficulty of reaching the line of the canal in this region were, described by MacFarland, as greatly "exaggerated," because the Cumberland—Hancock road, which paralleled the river, approached to within one-half mile of several of the meanders. A contractor, at small cost, could thus open lateral roads through the hollows connecting with the canal.

covered a bluff of "light brown sandstone, rather course in texture and interspersed on the surface with many dry seams." He described the stone as possessing "good cutting" properties.
On the "front of Alum Hill" at Oldtown, MacFarland pinpointed an "abundance of limestone suitable for cement." On the northern slope of the hill was a mill belonging to Mrs. Cresap, while at the lower end there was one belonging to Mr. Shepherd. Seven Springs Run, although small, was said by the inhabitants to flow year around. Two cement plants, in MacFarland's opinion, could be erected on Alum Hill. Should the stone on Alum Hill prove difficult to quarry, Shepherd's mill could be supplied with limestone from a quarry on Taylor's land, while Mrs. Cresap's could draw its stone from a quarry near the Flintstone Road.[6]

On March 24, 1836, the Board of Directors, having studied MacFarland's report on sources of stone and cement above the Cacapon, determined that his reconnaissance had been made with too much haste. Since it was likely that the canal from Cacapon to Cumberland might be put under contract at an early date, it was recommended that Commissioner Bender have MacFarland "perfect his examination."[7]

Subsequently, MacFarland notified Commissioner Bender that he believed all mills in the Oldtown area might be "brought into requisition." A more thorough examination of eastern Allegany County had satisfied him that the best stone for cement in the Oldtown area would be found near the mill belonging to Chapman, two miles north of Oldtown.[8]

Near the mouth of the South Branch, several additional quarries of "gray limestone, overlaid with brown sandstone" had been examined. Both the limestone and sandstone could "answer well for cutting purposes." The best of these quarries was located at the mouth of a small run, which entered South Branch from the west about 300 yards upstream from the mouth.[9]

Secretary John P. Ingle on May 9 wrote Commissioner Bender that, in accordance with a request from MacFarland, he was forwarding copies of the specifications for the four aqueducts to be built on the canal between the Cacapon and the South Branch. (A copy of the aqueduct specifications may be found in Appendix A.) MacFarland had written that he needed the specifications to enable him to judge if the stone he had located on his recent reconnaissance was satisfactory.[10]

Four months before, Commissioner Bender on January 27 had submitted to the President and Board of Directors an estimate prepared by Chief Engineer Fisk on the cost of constructing the canal from the Cacapon to the South Branch. Fisk had calculated the cost of the three aqueducts (Nos. 8–10), the several culverts, and the waste weirs needed along this section of the canal at $189,621.[11]

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6 MacFarland to Bender, Jan 2, 1836 (Ltrs. Recd. by President & Directors, 1835–1837).
7 Ingle to Bender, March 24, 1836, (Ltrs. Sent, Records of C & O Canal Co.)
8 MacFarland to Bender, May 18, 1836 (Ltrs. Recd. by President & Directors, 1835–1837).
9 *Ibid*.
10 Ingle to Bender, May 9, 1836, (Ltrs. Sent, Records of the C & O Canal Co.)
11 Bender to President & Board of Directors, Jan. 27, 1836 (Ltrs. Recd. by President & Directors 1835–1837)

The bonds issued by the State of Maryland to cover the $2,000,000 loan of 1835 had found a ready market and caused the Canal Company no trouble. But those issued to provide the $3,000,000 subscription in 1836 involved the Company in a tangled and increasingly precarious financial situation. It encountered trouble at the very start in obtaining the bonds or the proceeds from their sale, consequently, the Company, although the survey had been completed, had insufficient capital to call for bids for the construction of the canal above the Cacapon. Delays had occurred in putting the law into effect, while Maryland politics caused the postponement of the appointment of state commissioners to negotiate the sale of the bonds. By the end of March 1837, the Board had determined to purchase the bonds on behalf of the Company, if the state agents in Europe failed to market them. A provisional contract was drawn up.[12]

To be ready to push construction, as soon as capital became available, Commissioner Bender on February 22, 1837, wrote President George C. Washington that notwithstanding all that the Company had done for the contractors, "there will be a scarcity of hands, particularly masons and stone cutters," on the canal this season. Each contractor seemed to fear that if he exerted himself to "bring in hands," others would not, "and will reap the fruit of his exertion." Bender felt that it might be wise to dispatch MacFarland to Philadelphia, New York and Boston to see if he could prevail on skilled craftsmen to come to the Potomac Valley by "holding out such inducements" as the Board of Directors might authorize.[13]

The Board on March 1 authorized MacFarland's recruiting trip. MacFarland, however, was cautioned not to "bind the Canal Company to the payment of any money to hands whom he may induce to come down to the line, nor to security for wages of any who may come."[14]

Because of pressure from his other duties, MacFarland was unable to leave the line of the canal until March 20.[15]

Writing Chief Engineer Fisk from New York City in mid-April, MacFarland reported that the "situation was favorable to obtaining laborers and mechanics." Already, some of the men recruited had started for the canal.[16]

When he visited the Erie Canal in May, MacFarland was disappointed to observe that his Company's contractors appeared to be "greatly wanting in enterprise." He found the stone cutting and masonry on the New York canal "greatly superior to ours and apparently done at less cost."[17]

While MacFarland was absent inspecting the Erie Canal, Fisk on May 1 recommended to Commissioner Bender that whenever the Board felt it advisable "to put more work under contract," he would recommend the letting of the entire line from the Cacapon to Cumberland. If the Board went along with his suggestion, Fisk would recommend that Assistant Engineer Morris, with his

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12 Walter S. Sanderlin, *The Great National Project, A History of the Chesapeake and Ohio Canal* (Baltimore, 1946), pp. 129–130.

13 Bender to Washington, Feb. 22, 1837 (Ltrs. Recd. by President & Board of Directors).

14 Ingle to Bender, March 1, 1837 (Ltrs. Sent, Records of the C & O Canal Co.)

15 Bender to Ingle, March 20, 1837 (Ltrs. Recd. by President & Board of Directors).

16 Fisk to Bender, April 19, 1837 (Ltrs. Recd. by President & Board of Directors).

17 MacFarland to Ingle, May 8, 1837 (Ltrs. Recd. by President & Board of Directors).

rodman (A. H. Williams) be left in charge of the division from Licking Creek to Hancock. In addition, it was planned that Morris have supervision of that part of the line east of the area where Charles H. Randolph had jurisdiction. This section would include the Tunnel, over which he already had general superintendence through Assistant Engineer Henry H. Dungan. Fisk felt that Dungan ought to continue to oversee work at the Tunnel.

Randolph at the same time would be in charge of the new line (from Section No. 324 to Section No. 349), which was below Joshua Gore's division. As heretofore he would look after the Oldtown Deep Cut, Sections Nos. 333 and 334.[18]

The Board on June 15 advised Bender that, after studying Fisk's recommendations, it had determined to let contracts in August "embracing all the line between Cumberland and the Narrows, a distance of ten miles." At the Narrows temporary locks could be placed by which the navigation from Cumberland could be accommodated one year earlier than by a continuous canal. Between the Narrows and Dam No. 6, the most difficult sections (the cost of which had been estimated to exceed $20,000 each), together with such less costly sections as Chief Engineer Fisk believed to be necessary in the construction of those costing over 20,000 dollars, would be put up for bid. Fisk had told the Board that 58 sections would be involved.

At the same time, proposals would be invited for the remaining locks, culverts and aqueducts.[19]

Three days before (on the 12th) the stockholders of the Company were informed that between Dam No. 6 and Cumberland, four aqueducts of from 50- to 75-foot span would be constructed. The streams to be crossed by these structures were: Sideling Hill Creek, Fifteenmile Creek, Town Creek and Evitts Creek.[20]

In view of the decision to let contracts for opening the canal from the Cacapon to Cumberland, as many of the "engineer corps" as could be spared from other duties were turned to "revising the line and setting stakes, many of which had been displaced by accident or design."

The Board of Directors was assured in mid-June by Chief Engineer Fisk that all "preparations will be made, so that the letting may be had by August 1."[21]

On June 14 the Company had inserted in the area's newspapers an announcement:

> "At the Office of the Commissioner of the Canal at Hancock until the 2nd day of August, and at this office until the 3rd day of August next, inclusive, proposals will be received for constructing fifty-eight sections of the Chesapeake and Ohio Canal, three aqueducts, twenty locks of 8 feet lift each, and seventy culverts on the line thereof."

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[18] Fisk to Bender, May 1, 1837 (Ltrs. Recd. by President & Board of Directors). Morris was in charge of the line from Section No. 288 to and including Section No. 323.

[19] Ingle to Bender, June 15, 1837 (Ltrs. Sent, Records of the C & O Canal Co.); *Ninth Annual Report*, C & O Canal *Co.*

[20] *Ninth Annual Report* (1837), C & O Canal *Co*

[21] *Ibid*.

This work was situated between the mouth of the Cacapon and Cumberland, and covered about 29 of the 50 miles between these two points. The sections would be staked and the line ready for examination by July 1. All told, it was estimated that the "cost of the work … offered exceeds two million dollars; and the general health of the country through which it is to pass" was believed to be as "good" as that of any other line of public work currently in progress.[22]

Before the bids were opened, Commissioner Bender moved to secure title to the land needed by the Company at Town Creek. Here the canal right-of-way would cross property owned by the heirs of James Tidball. When the heirs refused to accept Bender's offer, the case was thrown into the courts.

A jury, which the sheriff of Allegheny County had convened at Oldtown to hear the claim of the Tidball heirs against the Chesapeake and Ohio Canal Company, ruled on July 18, 1837, that the Company should construct along the berm side of the canal a tailrace leading into Town Creek for the use of Ash's grist and sawmill. The tailrace was to be 12-foot in width on the bottom, with such "a descent as shall be equal" to that of the present one. In addition, the Company was to leave open for use of the landowners, the well on the berm side of the canal back of the stable. In a like manner, the Company was to construct a road "outside and along the berm," in place of the Oldtown road which would be disrupted by the construction of the canal. The Company was to reimburse the Tidball heirs for damages to crops caused by people working on the canal. For the right-of-way across the Tidball property, the Company was to pay $2,435 in damages.[23]

The Committee on Contracts reported on September 29 that the successful proposal for the construction of Aqueduct No. 10 across Town Creek was William Pratt's, whose bid was $46,715. The next day, the Board of Directors wrote Pratt that his bids had been accepted. But as the Company had not consummated its negotiations for the sale of the $3,000,000 of 6 percent bonds of the State of Maryland (the proceeds of which were designed to finance the new work), no money could be disbursed to contractors. Until the bonds were sold, the Company would be unready to make payments on estimates, except through use of notes about to be issued.[24]

Twelve days later, October 11, Frederick Pratt of Fayetteville, New York, wrote United States Representative William Taylor requesting that he call at the Georgetown offices of the Chesapeake and Ohio Canal Company and secure copies of the "propositions for Aqueducts Nos. 9 & 10, also for Locks 69, 70 & 71." William Pratt, he explained, as his agent had filed the low proposals for these works of art. It would be appreciated, if Representative Taylor would pick up the specifications and plans for these aqueducts and locks.[25]

As he expected to be leaving Washington immediately, Representative Taylor wrote President Washington, asking him to mail the requested documents to his home at Manlius, New York.[26]

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22 *Journal of Proceedings of the President & Directors*, Advertisement No. 58.

23 Inquest on land held by the heirs of James Tidball, July 18, 1837.

24 Ingle to W. Pratt, Sept. 30, 1837 (Ltrs. Sent, Records of the C & O Canal Co.)

25 F. Pratt to Taylor, Oct. 11, 1837 (Ltrs. Recd. by President & Board of Directors). Frederick and William Pratt were brothers.

26 Taylor to Washington, Oct. 16, 1837 (Ltrs. Recd. by President & Board of Directors).

Frederick Pratt on October 18 dropped a letter in the mail to Fisk, inquiring as to the "condition of work on the Chesapeake and Ohio Canal." In addition, he wished to know if all the heavy "rock sections" had been let. If not, he desired to know if the company had any "rock sections" it could let at private contract, provided he put on the project such force as Fisk named. As for Aqueduct No. 10, he promised to commence work soon.[27]

None of the contractors who had filed successful bids, because of the straitened financial condition of the Company, were in a hurry to begin work. In mid-December, Morris complained, "none of the contractors to whom work in the Tunnel District" has been let have reported to "any of the corps of engineers connected with me." As yet, Frederick Pratt, the contractor for Aqueduct No. 10, had not been "seen or heard from," while Willis Hatch, the contractor for Section No. 323, was said to have been at the site and then left, as he stated, "for tools, etc."[28]

Contractor Pratt in February 1838 determined it would not be in his best interests to undertake the construction of the Town Creek Aqueduct. Hatch, learning of this, agreed to assume Pratt's obligations. On February 24 Secretary Ingle wrote Hatch that a power of attorney had been received from Frederick Pratt, authorizing him to enter into a contract on his behalf for "Aqueduct No. 10 and to receive money or estimates." Commissioner Bender was directed to prepare a contract for Hatch's signature.[29]

Before Hatch's people could begin work on the Town Creek Aqueduct, Superintendent of Masonry MacFarland would have to name an artisan to oversee the stonework. When given the go ahead by Chief Engineer Fisk, MacFarland named William Challoner to the post of Assistant Superintendent of Masonry of the line from Section No. 312 to Section No. 323. Challoner for his services was to be paid $2.25 per day.[30]

Hatch soon had a crew organized. When the Board of Directors issued its *Tenth Annual Report* in June, the stockholders were delighted to learn that contracts had been made with "responsible and generally experienced men, who are commencing their operations with great spirit." It was forecast by the Board that the "entire canal from [the] Cacapon to Cumberland will be opened simultaneously by the close of year 1839, or, at the farthest, in time for the spring trade of 1840."[31]

Assistant Engineer Morris in mid-April visited the quarry at the mouth of the South Branch recently opened by Hatch. On doing so, he was delighted to see that the stone "in point of solidity, durability, and free sifting" was decidedly superior to any he had seen on the Tunnel Division.

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[27] F. Pratt to Fisk, Oct. 18, 1837 (Ltrs. Recd., Chief Engineer).

[28] Morris to Fisk, Dec. 17, 1837 (Ltrs. Recd., Chief Engineer). Aqueduct No. 10 was on Section No. 323.

[29] Ingle to Hatch, Feb. 24, 1838 (Ltrs. Sent, Records of the C & O Canal Co.).

[30] MacFarland to Fisk, April 12 & June 22, 1838 (Ltrs. Recd., Chief Engineer).

[31] *Tenth Annual Report* (1838), C & O Canal Co. Commissioner Bender, who had submitted a letter of resignation on May 3, turned over his books and papers on May 31 to Thomas Fillebrown. Fillebrown acted as commissioner till July 16, when Michael Sprigg of Allegany County was named commissioner. Ingle to Bender, May 9, and Ingle to Fillebrown, July 16, 1838 (Ltrs. Sent, Records of the C & O Canal Co.)

This stone, he wrote, is a "bastard limestone" of "ample supply for the arch and face stone of Aqueduct No. 10."

Before leaving Town Creek, Morris discussed with Hatch how he wished the "courses." The were to begin on the "skewback, 25 inches on the soffit, thence to diminish by ½ inch each to 15 inches next to the key." The key would be 20 inches, while the entire arch (of 60-foot span by 15-foot rise) 42 courses clear of the key or 43 courses in all. Two of the courses would be of 20 inches; and two of 17 inches, the others were to "vary one from another ½ inch each."[32]

Chief Engineer Fisk on April 24 advised Morris that he approved of the depth (3 feet and 2½ feet) proposed for the ring stones of Aqueduct No. 10. The specifications, in citing the dimensions for a 70-foot arch and in proportion for other arches, meant that the dimensions cited were considered sufficient for an arch of this scale.[33]

On June 10 Morris contacted his assistant, William Pratt, in reference to the courses for the Trunk Ashlar at Aqueduct No. 10. According to Morris they were to be:

Berm Side		Towpath Side	
	Inches		Inches
1	22	1	23
2	20	2	21
3	18	3	17
4	15	4	14
Coping	12	Coping	12
Total	87	Total	87

The total height of the cutstone on the inside of the parapet, including the coping, was to be 7¼ feet. The courses of Trunk Ashlar were to be cut by the contractor at the nearest height laid down for each. The five mortar points were to total one inch, making the height of the cut work, 88 inches.[34]

Morris, at the end of the first week in July, forwarded to Chief Engineer Fisk detailed drawings he had prepared of Aqueduct No. 10. (See Appendix B)

On July 10 Morris visited the site, where he discussed the project with Contractor Hatch and Assistant Engineer Pratt. The contractor claimed that work had been slowed by a cement shortage. In an effort to keep the contractor happy, Morris ordered A. Lynn of Cumberland to deliver 1,500 bushels of cement to Hatch.[35]

The next day, the 11th, Morris reviewed with his assistant, Pratt, the drawings of the Town Creek Aqueduct. On doing so, he told Pratt that the "length of every course of your Trunk Ashlar will be from return to return:

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32 Morris to Fisk, April 18, 1838 (Ltrs. Recd. Chief Engineer).
33 Fisk to Morris, April 24, 1838 (Ltrs. Recd., Morris).
34 Morris to W. Pratt, June 10, 1838 (Ltrs. Sent, Morris).
35 Morris to W. Pratt, July 10, 1838 (Ltrs. Sent, Morris).

	Feet	Inches
On Towpath side	88	4
On Berm side	90	4
The 4 returns each	16	—
Total feet running of the face of each course including both sides	194	8

The vertical angles of Ashlar joining the return were to be rounded "by a radius of 3 inches for their whole height and so also will be the jamb coping which will conform to the return as laid down" in the drawings.

The 4-foot by 2-foot returns at each end of the trunk were to be formed 11 feet below the top of the "coping of such side as will be necessary and will continue thence. Plumb on two sides so as to come out exactly 4 ft. wide & 2 ft. deep at the top of the coping."

On its inner edge, the coping of Aqueduct No. 10 was to be rounded by a 3-inch radius for the entire length of the trunk.[36]

Satisfied that the situation at Aqueduct No. 10 was well in hand, Morris left Town Creek. On the next day, July 12, Hatch's partner, Negus, visited the area. Negus was in a bad humor, and when he accosted Pratt, he demanded to know why Morris had made such a low estimate of the work done on Section No. 323 in June. Unless Morris agreed to a "remeasurement," Negus threatened to discharge the crew.

After his anger had subsided, Negus apologized to Pratt for his outburst, but he announced he could not see why Morris had not given Hatch permission to include the embankment for Aqueduct No. 10 in the estimate for Section No. 323. The entire character of the Canal Company, he complained, "was to deceive their contractors." At the moment, he knew of one contractor to whom the Company was in debt for $60,000.[37]

On July 10 Chief Engineer Fisk had notified Hatch that he must increase his force "to the extent necessary to enable you to complete" Aqueduct No. 10 within the time specified in your contract. According to all reports reaching Fisk, it was at present insufficient. In addition, Hatch was to take such steps as will "with the least possible delay place the material prepared near the site of the aqueduct."[38]

Two weeks later, Fisk repeated his orders for Hatch to take immediate steps "to deliver the materials prepared for your aqueduct." So little had been done during the past months in "the way of delivering stone by water" that it would now be necessary to resort to land transportation. Once again, Fisk called on Hatch to reinforce his force "to the extent necessary to insure completion of your work in the required time.[39]

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36 Morris to W. Pratt, July 11, 1838 (Ltrs. Sent, Morris).
37 W. Pratt to Morris, July 12, 1838 (Ltrs. Sent, Pratt).
38 Fisk to W. Pratt, July 10, 1838 (C & O Canal, Chief Engineer's Ltr. Bk., 1837–1839).
39 Fisk to W. Pratt, July 27, 1838 (C & O Canal, Chief Engineer's Ltr. Bk., 1837–1839).

Meanwhile, Morris on the 12th reported to Fisk that, during his recent stay at Town Creek, he had "ventured" to relocate Aqueduct No. 10. As only one cofferdam had been built, and only one wing and abutment excavated, he did not believe the cost of this change would be very serious.[40]

Four days later, on July 16, Morris notified Assistant Engineer Pratt that the "cement house" at Aqueduct No. 10 was to be built as near to "our plans" as circumstances will permit, taking into consideration that speed is of the essence. Had they three months in which to erect the structure, Morris would be compelled to require that it conform to specifications.

Morris regarded the "beginning of Aqueduct No. 10 of such importance" that in view of Pratt's lack of skill in masonry, he wrote MacFarland, requesting him to help oversee the project.

Pratt was directed at this time to have Assistant Superintendent of Masonry Challoner prepare by August 1 a return of all stones dressed or quarried for Aqueduct No. 10. On measuring the stone, Challoner was to mark them with red or yellow paint, with numbers beginning with one. Henceforth, the project engineer by checking Challoner's tally book would be able to identify "No. 29 water table, No. 51 ashlar, No. 98 sheeting, or No. 110 coping."[41]

No record of the stone marked by Challoner in July can be found. Challoner on September 1 reported that in August he had tallied

75 5/4	superficial feet of sheeting
26.8	superficial feet of ashlar
15 feet 10 ¼	linear feet of Skewback
50	perches of rubble

Lynn during the same period had delivered 635 bushels of cement, 500 bushels of sand, and 100 perches of rubble to the Town Creek site.[42]

The number of men employed on Aqueduct No. 10 decreased from 30 at the beginning of August to 15 at the end of the month. Included in this force were three mason, one stone cutter and eleven laborers. This situation caused Morris to debate recommending the "abandonment of Aqueduct No. 10."[43]

Low water caused by a late summer's drought brought the manufacture of cement at Lynn's Cumberland mill to a stop. The cement shortage by September 6 had become so acute that Hatch was hard-pressed to keep even his small force employed. As the days passed, Morris was reinforced in his belief that Hatch would never complete the Aqueduct.[44]

Morris on September 17 wrote Chief Engineer Fisk that Pratt had notified him that Contractor Hatch was "very nearly out of cement." To cope with this situation and prevent the total stop-

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40 Morris to Fisk, July 12, 1838 (Ltrs. Sent, Morris).
41 Morris to Pratt, July 16, 1838 (Ltrs. Sent, Morris).
42 Challoner to Pratt, Sept. 1, 1838 (Ltrs. Recd., Pratt).
43 Morris to Fisk, Sept. 6, 1838 (Ltrs. Sent, Morris). There were ten horses assigned to Hatch's crew.
44 MacFarland to Fisk, Sept. 8, 1838 (Ltrs. Recd., Chief Engineer).

page in the laying of masonry, Morris ordered Pratt to have Hatch dispatch two teams to Shepherd's Oldtown Mill to haul down to Town Creek 40 bushels of cement per trip. The wagon was to be kept running until Lynn's plant resumed shipments.[45]

Three days later, Morris urged Pratt to "see that the character of the mas. [masonry] at Town Creek is … improved … and particularly that a sufficiency of headers stone are laid in the wall." The headers were to be placed every 10 linears of the face and rear as a header opposite the stretchers of the point.

Pratt and Challoner were to "see that cement enough is used to make the walls one solid mass either of stone or cement or … of both combined."

No time was to be squandered in finishing the new mill race on Section No. 323, and Pratt was to see that Hatch worked his entire force on that part of the section.[46]

Previously, Morris had informed Pratt that he had determined to "make the Berm Bank across the Valley of Town Creek 12 feet wide on top in lieu of 8 feet."[47]

Additional drawings of Aqueduct No. 10 were prepared by Morris during the month to guide Pratt and the contractor (See Appendix C).

Challoner on October 1 reported that in September there had been prepared for Aqueduct No. 10 at the quarry:

291 superficial feet of ashlar, quarried and cut.
158 superficial feet of sheeting, quarried and cut.
17 feet 7 inches, linear, of skewback, quarried and cut.
49 feet 9 inches, linear, of water table, quarried and cut.
9 feet, linear, of towpath coping, quarried and cut.
1 block 3 feet 2½ inches by 3 feet 2 inches, 20 inches thick.
3 feet, linear, of berm coping, quarried and cut.
1 block 4 feet by 2 feet 4 inches, 20 inches thick.
35 superficial feet of stone partly dressed.

At the site there were:

266 superficial feet of ashlar, deliver and cut.
9 feet 8 inches, linear of skewbacks, delivered and cut.
5 feet, linear, of water table, delivered and cut.
395 superficial feet of dressed stones for rubble.
50 perches of rubble stones, delivered.
25 perches of red sandstone, quarried on the ground.
550 bushels of sand, delivered.
906 bushels of cement, delivered.[48]

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45 Morris to Pratt and Morris to Fisk, Sept. 17, 1838 (Ltrs. Sent, Morris, and Ltrs. Recd., Chief Engineer). Hatch was to be allowed $5.00 per trip for the use of his teams.

46 Morris to Pratt, Sept. 20, 1838 (Ltrs. Sent, Morris).

47 Morris to Pratt, Sept. 12, 1838 (Ltrs. Sent, Morris),

After studying Challoner's tally, Morris saw that it listed all stone at the quarry and the site. He therefore recommended that before the estimate was paid Fisk secure a bill of sale from Contractor Hatch.[49]

The situation relating to the force at work on Aqueduct No. 10 continued to deteriorate in September. By the last week of the month, there were only one mason, five stone cutters and 12 laborers on the job.[50]

Morris on October 12 complained to Fisk that on his division:

> All sections (except 4) and all the masonry are still so badly deficient in force that I am only deterred from suggesting that this month a general abandonment of all works except the Tunnel and Secs. 297, 313, 322 & 323 …

But when he reflected on the situation, Morris realized that at present there were neither enough contractors nor "those of the right sort, to take charge and energetically prosecute the various projects."

Morris was of the opinion that the Board of Directors should designate a general "releting of abandoned work and that extensive public notice should be given" of the date scheduled." This notice should state that the projects to be relet were valued at $1,000,000 and consisted of "very heavy section work and masonry," which had been declared abandoned by the Company because of insufficient progress.[51]

Contractor Hatch in mid-October absconded, "leaving the country considerably in debt." On the 22nd Morris complained to Fisk that Aqueduct No. 10 had been abandoned by Hatch since early in the month.[52] (At the time of Hatch's flight, $3,770.09 had been paid out by the Company on estimates for work done on Aqueduct No. 10. See Appendix D).

Several days earlier, Morris had taken the precaution of directing Pratt to oppose any attempt by Hatch's creditors to sell the stone for Aqueduct No. 10, "which has been estimated at the quarry."[53]

William Story of Hancock, on learning that Hatch had abandoned his contract, prepared a proposal for the completion of Aqueduct No. 10, and two other projects that had been declared abandoned—Culvert No. 215 and Lock No. 67. Story's proposals were forwarded to Fisk by Morris on November 12.[54]

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48 Challoner to Pratt, Oct 1, 1838 (Ltrs. Recd., Pratt).
49 Morris to Fisk, Oct. 5, 1838 (Ltrs. Sent, Morris).
50 Pratt to Morris, Oct. 11, 1838 (Ltrs. Sent, Pratt).
51 Morris to Fisk, Oct. 5, 1838 (Ltrs. Sent, Morris).
52 Morris to Fisk, Oct. 22, 1838 (Ltrs. Recd., Chief Engineer). Hatch called Sherburne, Chenango County, New York, his home.
53 Morris to Pratt, Oct. 14, 1838 (Ltrs. Sent, Morris).
54 Morris to Fisk, Nov. 12, 1838 (Ltrs. Recd., Chief Engineer).

If his proposals were rejected, Story (who had recently completed several "works of art" for the Company) would have to seek work elsewhere, probably in Illinois. Should his bid be accepted for Aqueduct No. 10, Story planned to boat all the "sheeting & nearly all the other cut stone from either Cumberland or Evitts Creek quarries."[55]

On November 19 Story wrote Fisk that the prices he had quoted for completing the "works of art" were based on the "supposition that the whole of the stone for all the works" could be had from the quarry at the mouth of the South Branch. But, on visiting that quarry, he had discovered that there was no possibility of it furnishing "thin ledges such as would make coping, or water table …" As the contractor would have to travel some distance to secure stone for these, it was reasonable that he should be paid the cost of transportation for this extra distance. If his bid were accepted, Story wanted it to be spelled out in his contract that if he were compelled to haul stone from a considerable distance, he would be paid a fair price for transportation. Under no circumstances was he to be paid for a greater quantity than 252 perches, which was "just about the quantity required for coping for the three works" and water table for the aqueduct.[56]

William Challoner on November 10 reported to MacFarland that the quarrying operations at the North Branch had cost Hatch:

About $2 per perch.
Ashlar had cost 18¢ per superficial foot.
Sheeting about 25¢ per superficial foot.
Dressed pebble stone 23¢ per superficial foot.

A crew of two masons, four laborers, two-horse dray, one man and one driver, and one man at the cement house had got out six perches of stone per day. He felt than an identical force could accomplish more, provided the quarry had been more convenient to the aqueduct.

A four-horse team from the quarry had averaged three loads of stone per day to the construction site. There were about 22 cubic feet of stone to the load.

A piece of sheeting of 8 feet 6 inches, soffit measure, had taken five-man days to prepare. A piece of Ashlar of 6 feet, soffit measure, required three man-days to prepare. Nevertheless, Challoner felt certain that a man could work 2½ to 3 feet of ashler per day.

An agreement had been reached with the stone cutters whereby they were to be paid:

$1.37½ per superficial foot, soffit measure, for sheeting.
$0.75 per superficial foot for ashlar.
$1.12½ per linear foot for water table.
$1.75 per linear foot for coping.
$2.00 for skewback, measuring one of the longest joints.

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55 Story to Fisk, Oct. 26, 1838 (Ltrs. Recd., Chief Engineer).
56 Story to Fisk, Nov. 19, 1838 (Ltrs. Recd., Chief Engineer).

Samuel Barrack and John Hall, stone cutters, had promised Hatch they would cut his sheeting for $1.25 per superficial foot (soffit measure) and 66¢ per superficial foot for ashlar.

If work were resumed at the South Branch quarry, Challoner believed costs could be cut to:

1. Quarrying, including shipping, etc. at $2 per perch, backing and face stone inclusive.
2. Quarrying face stone per superficial foot 18¢
3. Quarrying sheeting per superficial foot 25¢
4. Cutting sheeting per superficial foot, soffit measure $1.25
5. Cutting ashlar per superficial foot 62½¢
6. Cutting water table per linear foot 87½¢
7. Cutting coping per linear foot, admitting the table to be 3 feet wide $1.25
8. Two masons to lay six perches per day, attended by two stone drays with single teams and driver, and five other laborers, including the mortar man.
9. Four-horse teams, averaged 3 loads per day from quarry, hauling 22 cubic feet per load. Rate $5 per day.
10. Hatch's two-horse teams averaged 16 cubic feet per load, making four loads per day.

The $2 per perch for the face and backing stone included the cost of stripping. This data had been compiled by observing the work of 16 laborers during one week, some of them stripping, while the rest were quarrying and attending the one team that was being worked at the quarry.[57]

On November 11, 1838, Fisk, (after studying Challoner's report) wrote Morris that "allowing largely for the hardness of the stone and the heavy stripping of the quarry at the mouth of the South Branch $11.50 would be a fair price for stone in Lock No. 67, while $25 would be the cost of the cut work in the Town Creek Aqueduct.

Given these prices, plus $7 for the rubble to be used in the aqueduct, Fisk believed the Board would be wise to contract with Story. It should be understood, however, that Story was to take "all the stone" from the South Branch quarry. Morris in his dealings with Story was to insist that he complete "his work in a reasonable time."[58]

Morris on December 1 reported that no work had been done in November on Aqueduct No. 10, Hatch having left the area.[59]

Because of a shortage of liquid assets, it was decided by the Board of Directors that the Company should go slow in its negotiations with Story. Consequently, Morris, in accordance with orders from Fisk, transferred Challoner from Town Creek Aqueduct to Fifteenmile Creek.[60]

Meanwhile, Pratt on November 15 reported that at the west abutment for Aqueduct No. 10, 850 cubic yards of earth and 110 cubic yards of rock had been excavated. At the east abutment 580 cubic yards of earth and 96 cubic yards of stone had been removed.[61]

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57 Challoner to MacFarland, Nov. 10, 1838 (Ltrs. Recd., Chief Engineer). The contractor allowed $5.00 per day for each four-horse team.

58 Fisk to Morris, Nov. 11, 1838 (Ltrs. Recd., Morris).

59 Morris to Fisk, Dec. 1, 1838 (Ltrs. Sent, Morris).

60 Fisk to Morris, Dec. 19, 1838 (Ltrs. Recd., Morris).

At the Eleventh Annual Meeting of the Stockholders held on June 3, 1839, the Board reported, on the "50-mile line progress has been as rapid as the means of the Company would justify, with a force varying from 2,500 to 3,000 laborers. A number of sections had been finished, while others nearly completed." Better yet, most of the "heavy sections were in good progress." This, however, did not include the Town Creek Aqueduct.[62]

Chief Engineer Fisk, after making a reconnaissance if the 50-mile section, reported in August that from Lock No. 66 (the first below the Tunnel) to Lock No. 67 it was seven miles. Lock No. 67, which had a lift of eight feet, was not currently under contract. It had been let, but it had been abandoned by the contractor.

From Lock No. 67 to Lock No. 68, opposite the mouth of the South Branch, it was three miles. Only one-half mile of this level was under contract; the rest, principally along the river bottom, would be "comparatively easy ground." Near the lower end of this level there would be a culvert of 16-foot span. The culvert had been under contract, but it had been abandoned and had not been relet. About one-half mile above Lock No. 67 was Town Creek, over which the canal would be carried by an aqueduct of 60-foot span and 15-foot rise. The Town Creek Aqueduct, Fisk observed, "was once under contract but work commenced and abandoned and has not been relet." Connected with the berm upper wing of this aqueduct would be a waste weir.[63]

Fisk on June 10 had requested Morris to provide him with "an accurate statement of the distance in miles and feet from the upper end of Section No. 323 to Aqueduct No. 10—thence to Culvert No. 215—thence to Lock No. 67 …" This data was to be used in ascertaining the distance of the river line over the canal line. The Company at this time was paying 1¼ cents per mile per bushel for the transportation of cement by the river line. If the canal line were less, an effort would be made to get the people hauling cement to use that figure in computing costs.[64]

Morris on July 21 suggested that when the contract was relet that the spring of Aqueduct No. 10 be raised to 17.0, thus making the "arch 60 & 10." (See Appendix E for drawing of Morris' proposal.) Fisk was agreeable and sanctioned the change.[65]

On September 25 Fisk advised the Board that in his opinion it would be feasible to change the plan for Aqueduct No. 10. (A plan had been advanced to build the trunk of wood.) If this were done, navigation would be interrupted, for a considerable period, whenever it was determined to substitute a permanent structure for the temporary one. After checking with MacFarland, Fisk assured the Board that there is "no want of stone for the aqueduct within a reasonable distance …"[66]

On November 20 Morris estimated that to complete Aqueduct No. 10 would require:

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61 Fisk to Morris, Nov. 15, 1838 (Ltrs. Recd., Morris).
62 *Eleventh Annual Report*, June 3, 1839 (*Proceedings of the President & Board of Directors*).
63 *Ibid*.
64 Fisk to Morris, June 10, 1839 (Ltrs. Recd., Morris).
65 Morris to Fisk, July 21, 1839 (Ltrs. Sent, Morris).
66 Fisk to Board of Directors, Sept. 25, 1839 (Ltrs. Sent, Chief Engineer).

	Quantity	Price
Cubic yards of earth	2,500	$750
Cubic yards of rock	400	600
Cubic yards of puddling	3,000	900
Perches of arch or cutstone	600	16,800
Perches of straight or rubble	4,300	30,000
Miscellaneous		3,200
		$52,350
Contingencies, 10%		5,235
Total[67]		$57,585

The Board of Directors on June 1, 1840, notified the stockholders that on the "50-mile section," the work in progress appeared to be in "charge of energetic and active contractors, and to be pressed with as much vigor as the finances of the Company will allow."

Chief Engineer Fisk, who had just returned from the field, reported that Section No. 323, a heavy section, had been seven-tenths completed and was as near finished, "as it can be until Aqueduct No. 10 over Town Creek shall have been built, but which is not now under contract." As for Aqueduct No. 10, it had been scarcely commenced when Contractor Hatch had disappeared.

At the moment, the nine locks, one aqueduct, and seven culverts on the 18½ miles of canal from Sections No. 282 to No. 328, estimated to cost when finished $412,258, were only one-tenth completed. Fisk estimated that it would take 3,000 men "in constant employ" from the present, two years to complete the "50-mile section." Currently, there were about one-half that number at work. As for the "works of art," the Board and stockholders must realize that there were four or five months of the year when masonry work was "to a very considerable extent suspended."[68]

Frederick Pratt on January 27, 1840, wrote to Fisk, inquiring about the work done on Aqueduct No. 10 by Hatch in the name of Pratt and Hatch. He wished to know whether any money was due them on Morris' estimates. If he understood correctly, there was about $1,500 on the Company books that was owed them. Should this be true, they would be obliged to receive it "for the work was a very unfortunate piece of work for us as we paid out on that work about $5,000 more than we have received."[69]

Checking the book, Fisk saw that the Company owed Pratt and Hatch $942.52. On May 31 this sum was forwarded to the contractors.[70]

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67 Morris to Fisk, Nov. 20, 1839 (Ltrs. Sent, Morris).
68 *Twelfth Annual Report*, June 1, 1840 (*Proceedings of the President & Board of Directors).*
69 F. Pratt to Fisk, Jan. 27, 1840 (Ltrs. Recd., Chief Engineer).
70 Ledger Book B, C & O Canal Co.

CHAPTER II: TOWN CREEK AQUEDUCT COMPLETION AND OPENING OF THE 50-MILE SECTION

After construction halted, following the exhaustion of the Company's immediate resources, the State of Maryland paused in its promotion of the project to review the condition of the canal. By 1842 the canal had been completed as far as Dam No. 6, a distance of 135 miles from Georgetown. Work done thus far had been accomplished under the most trying circumstances. A succession of obstacles had marred the construction, delayed the completion, and increased the cost of the project far beyond all expectations. Disputes over the right-of-way, cholera epidemics, continual labor, financial, and engineering problems, and political machinations all contributed their share. By 1842 over $10,000,000 had been disbursed for the construction of the canal and to incidental expenses. In supplying the major share of this sum, the State of Maryland had acquired control and direction of the Company's affairs from the Federal Government and the cities of the District of Columbia.[71]

The section of the line from Dam No. 6 to Cumberland, which had not yet been completed, was referred to as "the fifty miles." While the region through which it passed included some of the most beautiful and rugged country in the Potomac Valley, it lacked good building stone. Thus, both excavation and masonry work promised to be expensive. Although, all but 18 miles of the section had been completed, the unfinished parts were dispersed over the entire 50 miles and included most of the "heaviest work—the Paw Paw Tunnel, the deep cuts," three aqueducts (No. 8, 9 and 10), etc. It was estimated by Chief Engineer Fisk in 1842 that $1,545,000 were required to complete the 18 miles. Great difficulty, however, would be faced in acquiring the funds and recruiting the necessary working force.[72]

By 1842 the financial condition of the company was deplorable, if not hopeless. Company officials publicly acknowledged debts of $1,196,400 above all means. Many of the Company's resources were tied up in the few remaining five percent bonds it owned.[73]

Further progress on the canal was impossible without additional help, but in the straitened financial circumstance of the State of Maryland, further aid from that source was problematical. State leaders were hostile toward the Company for the way it had disposed of the bonds authorized by the Act of 1836, and with the completion of the Baltimore & Ohio Railroad to Cumberland in 1842 many legislators saw little need to extend the canal.[74]

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[71] *Thirteenth Annual Report* (1841), p. 28; Sanderlin, *The Great National Project*, p. 138. About $2,000,000 more had gone into interest and losses.

[72] Fisk to President & Directors, Dec. 1, 1842; *Sixteenth Annual Report* (1844), p. 5; Sanderlin, *The Great National Project*, p. 139.

[73] Sanderlin, *The Great National Project*, p. 139.

[74] *Niles' Register*, Vol. LXVIII, No. 11 (March 8, 1875), p. 16; *Ibid.*, No. 2 (March 15, 1845), pp. 23–24; Sanderlin, *The Great National Project*, p. 78. In 1836 Maryland had endeavored to put all internal

Thus three years were to pass before means were provided to resume work on the waterway. Meanwhile, the Baltimore & Ohio, being in a stronger economic position, was able to continue with the construction of its line toward the Ohio River.

Early in May 1843, the Board of Directors of the Chesapeake and Ohio Canal Company established ground rules under which a contract for the completion of the ditch could be negotiated.[75]

The contractor was to receive Canal Company bonds maturing in 20 years, bearing six percent interest payable semi-annually. Work was to commence in 60 days and the canal should be completed in two years. The maximum cost at which the contract would be negotiated was Chief Engineer Fisk's estimate of 1842. As security for the repayment of the bonds, the Company offered a pledge of all revenue, subject to existing mortgages. The latter phrase constituted a stumbling block, because the State of Maryland refused to waive its sizeable prior liens.[76]

The Board of Directors in 1843 and 1844 devoted considerable attention to a campaign to secure legislative approval of a waiver by the state. 1844 was both a national and state election year, so there was considerable excitement. Two big issues in the local campaign were the related subjects of the state credit and the condition of the canal. In some instances friends of the canal were defeated, but on the whole the results were favorable to both issues. Governor-Elect Thomas C. Pratt and many members of the new assembly proved friendly to the canal.[77]

Following the established procedure, proponents of the canal introduced a bill in the new legislature to provide for the waiver of the state lien. This time, after a long fight, it met with success. Both the canal bill and a stamp act to provide effective means of meeting the interest on the state debt, after being defeated, were considered and passed in the crucial House of Delegates by one vote, 38 to 37. The canal bill provided that the Chesapeake and Ohio Company could issue $1,700,000 of preferred construction bonds on the mortgage of its revenues, when it received guarantees from interested parties for 195,000 tons of trade annually for five years.[78]

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improvement companies in the state on a firm footing through an appropriation of $8,000,000 of which the Baltimore & Ohio Railroad and Chesapeake and Ohio Canal each received $3,000,000. Because of the tightness of the international money market in 1837 and the years immediately following, the Companies were unable to dispose of the state bonds (the form Maryland assistance invariably took) at the premium required by law, or even at par. Thus the large subscription was not fully effective and did not prevent the rise of a new crisis in railroad and canal finances. The Baltimore & Ohio being in a stronger position financially and having the advantage of full use of its line as far as completed was not as seriously affected as the Canal Company. The Canal Company hypothecated the bonds at levels well below par, in return for bank loans, incurring the wrath of state leaders for so doing. Sanderlin, *The Great National Project*, p. 77.

75 *Proceedings of Directors*, G, pp. 38–40 (May 4, 1843).

76 Sanderlin, *The Great National Project*, p. 148.

77 Mandeville to Price, Oct. 5, 1844; *A Short History of the Public Debt of Maryland*, p. 49; Sanderlin, *The Great National Project*, p. 152.

78 *Niles' Register*, Vol. LXVIII, No. 1 (March 8, 1845); Sanderlin, *The Great National Project*, p. 152.

The Canal Company and its friends promptly moved to secure the guarantees required and to receive the full benefits of the act. President James M. Coale traveled to Boston and New York to confer with officials of the Cumberland coal companies.[79]

There, he found evidence of interference by the Baltimore & Ohio interests. "I am induced to believe," he wrote the president of the Maryland Mining Company, "that the Balt. & Ohio R. Road interest, as their last throw of the die, are endeavoring to prevent the fulfillment of the guaranties."[80]

An article reputedly inspired from Baltimore was published in the New York *Herald* casting grave doubts on the value of the canal. It exaggerated the duration of enforced suspension during the winter months. It emphasized the more frequent handling and transshipment of coal via the canal route and the greater damage to the coal. President Coale refuted these assertions, but the effect of their publication among the financial interests in New York was felt.[81]

All the while, the Board conducted an extensive correspondence in it efforts to assure the guarantees. Friends of the canal were active along the Potomac. Public meetings were held in "the upper counties, and spirited addresses" were made to "enlist confidence in the completion of the work …" An ordinance was passed by the city of Alexandria to indemnify any of their citizens that might sign the bonds of guarantee.[82]

Twenty-eight instruments, including both personal and corporate ones, were eventually signed and delivered for 225,000 tons of trade. Governor Pratt formally accepted the guarantees and certified his approval in August 1845.[83]

After the guarantees were approved, the Board of Directors proceeded to the letting of the contract. It rejected the first proposals of prospective contractors in August 1845, and granted a ten-day delay for the submission of new offers.[84]

On September 23, 1845, the Board accepted the offer of Walter Gwynn, William Thompson, James Hunter and Walter Cunningham. Agents for the state gave their approval, and the contract was drawn up and executed. The additional mortgage to the State of Maryland, required by the legislature, was signed on January 5, 1846.[85]

By terms of the contract, Messrs. Gwynn & Co. agreed to provide materials of the required quality in workmanlike manner according to the specifications of Chief Engineer Fisk; to begin work within 30 days; to complete the canal by November 1, 1847; to raise $100,000 for the use of the Company (to pay its contingent expenses); to cash the bonds of the Canal Company at par,

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79 *Proceedings of Directors*, G, p. 228 (March 19, 1845); *Niles' Register*, Vol. LXVIII, No. 6 (April 12, 1845), p. 85.

80 Coale to Allen, May 8, 1845, Ltr. Bk. G. p. 258

81 Coale to Allen, May 13, 1845, Ltr. Bk. G. pp. 263–264.

82 *Niles' Register*, Vol. LXVIII, No. 6 (April 12, 1845), p. 85.

83 Special Report, 17th Annual Meeting (July 22, 1845); Sanderlin, *The Great National Project*, p. 154.

84 *Eighteenth Annual Report* (1846), pp. 6–7.

85 *Proceedings of Directors*, G, pp. 317–318, 320–323, 353–354.

paying the interest on them until January 1, 1848. The price to be paid Messrs. Gwynn & Co. for the work was fixed at $1,625,000 in canal bonds.[86]

Elwood Morris had resigned, and Assistant Engineer H. M. Dungan had succeeded him as assistant engineer in charge of the Tunnel Division. While negotiations were in progress to insure a resumption of work on the "50-mile section," Dungan was assigned to undertake a survey of his division. On June 9, 1845, Dungan notified Fisk that he had reached the South Branch, "having traced the center line quite satisfactorily." On doing so, he had discovered an error in chaining at Town Creek of five feet, four of which belonged to the completed portion of Section No. 324. The only clue in his possession regarding the error was a note in Joshua Gore's field book, "stating that No. 142 is the center of Aqueduct No. 10." If his memory served him correctly, Dungan recalled, the aqueduct was to have a span of 60 feet. If so, stake No. 142 should be 30 feet from the face of the abutment.[87]

With the contract with Gwynn & Co. about to be signed, Fisk laid plans to beef up his engineer corps. A number of former employees, who had been laid off and were interested in returning to work, were recalled.[88]

On October 12 Dungan wrote Fisk that he had encountered no difficulty in recruiting hands for his engineering force at 75¢ a day. By next spring, however, he doubted whether he could have "suitable hands … for less than $1 per working day."[89]

Meanwhile, Superintendent of Masonry MacFarland had visited the quarries in the area to measure the stone that had been cut and was on hand for use in the "works of art." On the 4th he reported that the "prevailing Epidemic has proved most disastrous in the measurement of the stones." At the moment, he was recovering from a "virulent attack of sickness." The measurement of the rock at the Town Creek site had been completed on the 3rd, but as yet his notes were in pencil.[90]

Although Gwynn & Co. had subcontracted a number of projects along the "50-mile section," many of the subcontractors were slow to get their forces organized. Gwynn & Co. had signed a contract with Gonder, Brayton & Co. for the completion of Aqueducts No. 8, 9 and 10, Sections Nos. 323, 330, 331 and 332, and Locks No. 68–71. By December, 1845, the only force employed in Dungan's division were those working on Section No. 221; 12 laborers, 5 carts and 5 horses.[91]

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86 *Eighteenth Annual Report* (1846), pp. 8–9.

87 Dungan to Fisk, June 9, 1845 (Ltrs. Recd., Chief Engineer). Personal differences between William Pratt and two members of his party (J. V. Patterson and Dixon Gough) had led to their resignations in May 1839.

88 Fisk to Patterson, Sept. 29, 1845 (Ltrs. Sent, Chief Engineer).

89 Dungan to Fisk, Oct. 12, 1845 (Ltrs. Recd., Chief Engineer).

90 MacFarland to Fisk, Oct. 4, 1845 (Ltrs. Recd., Chief Engineer).

91 Dungan to Fisk, Dec. 8, 1845 (Ltrs. Recd., Chief Engineer); *Twentieth Annual Report* (1848), June 5, 1848; *Proceedings of the Board of Directors*, G, pp. 285–286.

President Coale on March 25, 1846, notified Chief Engineer Fisk that at the next annual meeting of the stockholders, he would expect a report "showing the condition of the finished course, the breaches, etc., and also the progress made toward the completion under contract."[92]

Three weeks later Superintendent of Masonry, MacFarland complained to Fisk that "progress is so miserably slow" as to scarcely deserve notice. The people from Gonder, Brayton & Co. had been unable to make any "new discoveries in the way of good quarries." After a diligent search of the area, the only half-way promising new site pinpointed was on Captain Mitchell's land on Town Creek, about three and one-half miles upstream from the aqueduct. The quality of Mitchell's stone was similar to that from the old quarry at the mouth of the South Branch. A road would have to be opened to Mitchell's quarry, and MacFarland questioned whether the stone would hold out long enough to justify the expense.[93]

On April 27 Dungan notified Fisk that all work on his division had been suspended since the 24th, except on Section No. 324. Dungan at this time urged Fisk to "insist upon an adequate force being immediately put upon the work in general, the Tunnel in particular, to insure its completion in the time specified by the contract."[94]

In accordance with Dungan's suggestion, Fisk wrote Gwynn & Co. on May 19 that their attention "must be mainly directed to the Tunnel, the Town Creek Aqueduct, Dam No. 8 and guard lock, the locks and masonry in general."[95]

The stockholders learned in June that work on the "fifty-mile section" had been resumed in November. From the spirit manifested by the subcontractors, strong hopes were engendered that the work would now be prosecuted with "vigor and energy." The Board of Directors expectations were soon shattered. While there is no way of "ascertaining the actual expenditure," as of May 1 only $55,384 had been paid out on estimates filed by Chief Engineer Fisk. Of this sum, less than $4,000 had been disbursed for work on the Tunnel and masonry.

Along the "50-mile section," the number of employees from November until April had not exceeded 300 mechanics and laborers, and 100 carts. Since May 1 this force had been "gradually lessening," and when Fisk had left the canal, several days before, there were only 40 men at work.

On May 19 Fisk had given Gwynn & Co. notification, in writing, that they were to have at work by the last day of the month at least 500 laborers and mechanics, by the end of June 1,000, by the end of July 1,500 and by the last day of August 2,000 workers. At the same time, they were to have as many carts and teams as may be necessary to keep the mechanics and laborers "fully and properly employed."[96]

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92 Coale to Fisk, Mar. 25, 1846 (Ltrs. Recd., Chief Engineer).

93 MacFarland to Fisk, Apr. 13, 1846 (Ltrs. Recd., Chief Engineer).

94 Dungan to Fisk, Apr. 27, 1846 (Ltrs. Recd., Chief Engineer). Thompson, the contractor on Section No. 324, had three hands and two carts at work.

95 Fisk to Gwynn & Co., May 19, 1846 (Ltrs. Sent, Chief Engineer).

96 *Eighteenth Annual Report* , June 1, 1846 (*Proceedings of the President and Board of Directors*, C & O Canal).

Heavy rains over the watershed of the upper Potomac in late June caused the river to surge upward. The river crested at a point one foot below the flood of April 1843. Damage along the division supervised by Dungan was limited to the Town Creek area, where the berm bank was "half cut away … for some thirty feet."[97]

Gwynn & Co. having ceased all operations about June 1, 1846, Dungan, after measuring the Tunnel, discharged two of the engineering party.[98]

Negotiations for the sale of the bonds had been underway since before the formal signing of the contract with Gwynn & Co. Efforts of Senator Daniel Webster and of the Company itself to affect a loan in Great Britain failed when the House of Baring declined to take any part of it.[99]

Subsequent attempts to complete the necessary arrangements appeared to be making progress in May and June 1846. These hopes were dashed, when efforts to interest London, England, merchants failed. The contractors next turned to local capitalists for assistance. Here, conversations reached the point of assigning quotas to be subscribed by interested bankers. This plan likewise failed.[100]

Another year passed before negotiations again reached a stage which gave some promise of success. Several events by this time had improved the prospects affecting the sale of the bonds. The State of Maryland had finally provided for the payment of the arrears on its debt and for the prompt payment of the semi-annual interest in the future. This measure helped the credit of both the state and Canal Company. The Virginia Assembly now authorized the state treasurer to guarantee $300,000 of canal bonds. The corporations of Georgetown and Washington had authorized the loan of $25,000 and $50,000 respectively to the contractors in exchange for canal bonds, while the citizens of Alexandria took up a private subscription for $25,000. The effect of the activities of these three cities in April, 1847, was to guarantee to take $100,000 of the bonds.

Thus when the time rolled around to make another attempt to negotiate for the sale of the preferred construction bonds, some of the quotas had been guaranteed. Tentative arrangements provided for the distribution of the entire sum of $1,100,000 in cash needed to finish the project among Virginia ($300,000), the District cities ($100,000), Boston interests ($200,000), the Barings ($300,000), and the contractors ($200,000).[101]

These arrangements were temporarily threatened by the withdrawal of the Barings, because of the tightness of the international money market, but it was anticipated that by this time loyal capitalists could be persuaded to step into the breach. Three men (Allen B. Davis, Nathan Hale and

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97 Dungan to Fisk, July 4, 1846 (Ltrs. Recd., Chief Engineer).

98 Dungan to Fisk, July 20, 1846 (Ltrs. Recd., Chief Engineer); *Nineteenth Annual Report*, June 7, 1847 (*Proceedings of the President and Board of Directors*, C & O Canal).

99 *Proceedings of Board of Directors*, G, p. 311.

100 *Eighteenth Annual Report* (1846), p. 11; Cox to Coale, July 10, 1846.

101 *Nineteenth Annual Report* (1847), pp. 4-5; *Niles' Register*, Vol. LXXII, No. 12 (May 22, 1847), p. 179.

Horatio Allen), acting as agents for the contractors, were able to carry the negotiations to a successful conclusion.[102]

The Board in the fall of 1847 drew up and executed the mortgage of the Company's revenue. Phineas Janney of Alexandria, W. W. Corcoran of Washington, David Henshaw and George Morey of Boston, and Horatio Allen of New York were named by the Board as representatives of the 28 New York, Boston and Washington capitalists who had undertaken the sale of the bonds. By the terms of the final agreement, the financiers agreed to take $500,000 of the bonds and the subcontractors $200,000, in addition to the $400,000 already pledged by the State of Virginia and the District cities.[103]

Work was resumed on November 18, 1847, under a modified contract. The old company was reorganized and a new one succeeded to its contract with the Canal Board. Gwynn and Cunningham retired, but the remaining partners, Hunter and Thompson, continued with the addition of a third partner, Thomas Harris.[104]

The Board of Directors authorized various economy measures to facilitate the early completion of the canal. It was determined to substitute kyanized wood for stone in the locks, and the construction of lock-keepers' quarters and the arching of the Paw Paw Tunnel were to be deferred till after the canal was formally opened to Cumberland.[105]

Finally, all efforts were to be concentrated on the single object of completing the canal to Cumberland in some manner at the earliest possible date.[106]

Cement for masonry along the "fifty-mile section" would be supplied by Hunter, Harris & Co. A contract was signed by the company with George Shafer, who ran a mill below Dam No. 6, "to burn, grind and deliver at the mill 120,000 bushels [of cement] at the rate of 12,000 bushels per month, if required." A second contract was negotiated with Franklin Reynolds of Cumberland for 60,000 bushels at the rate of 6,000 bushels per month.[107]

Friends of the canal were delighted to learn from the Cumberland *Semi-Weekly Civilian* of October 22 that Hunter, Harris & Co. had promised to complete the canal to Cumberland. In agreeing to do this, the editor observed, they had "manifested a perseverance in the midst of unparalleled difficulties, which entitled them to the thanks of all interested in that great improvement. We heartily desire to see their efforts crowned with success, and sincerely hope they will reap an adequate reward of a most substantial character."[108]

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[102] *Niles' Register*, Vol. LXXII, No. 19, (July 10, 1847), p. 293; *Proceedings of Board of Directors*, H, pp. 92, 95; *Twentieth Annual Report* (1848), pp. 3 –4.

[103] *Proceedings of Board of Directors*, H, pp. 94-96; *Twentieth Annual Report* (1848), pp. 5-6.

[104] *Twentieth Annual Report* (1848), pp. 7-8.

[105] *Proceedings of Board of Directors*, G, p. 285. The Kyanizing process consisted of dipping the timbers in a "corrosive sublimate" to prevent early decay.

[106] Sanderlin, *The Great National Project*, pp. 157–158.

[107] *Twentieth Annual Report* (June 5, 1848)

[108] Cumberland *Semi-Weekly Civilian*, Oct. 22, 1847.

Readers of the *Semi-Weekly Civilian* learned on November 19 that the subcontractors were ready "to begin work on their respective sections at once." Since they were men of known energy, the editor expected them to "accomplish what they undertake at all hazards."[109]

Upon the resumption of operations in November 1847, Gonder, Brayton & Co. were committed elsewhere, so the firm determined to sublet its work on the Chesapeake and Ohio Canal. To this action, the Trustees raised no objections, provided the "security for the completion of the work was undiminished," and the payments as estimates while the work was in progress were made to the parties undertaking its execution.

Gonder, Brayton & Co. accordingly sublet their canal projects to Fraser & Co.[110]

By the end of the first week of 1848, many of the subcontractors had turned their men to. Solomon McCullough & Co. had commenced operations at the Tunnel on Monday, while W. W. Buck & Co. had a crew at work on the locks above and below the Tunnel. Bruce & Hughey were preparing stone for culverts; Peter Ritner & Co. were getting out stone to be used in the construction of locks and culverts. According to the subcontractors, hands were abundant on the entire line.

Fraser & Co. to whom Gonder, Brayton & Co. had sublet their contracts for Aqueducts Nos. 8, 9 and 10, Sections 323, 330, 331 and 332, and Locks Nos. 68–71 did not get started as promptly as some of the other contactors.[111]

When he inspected the "50-mile section" in the fourth week of March, Chief Engineer Fisk was not as impressed with what he observed as had been the editor of the *Semi-Weekly Civilian*. He was disappointed by the "smallness" of the forces at work. Writing the Trustees on March 27, Fisk reported:

> The masonry particularly, and more especially that of the Oldtown Locks and Town Creek Aqueduct has been, and is now, going on at a rate that will render it impossible to complete the Canal by the time required in the Contract, unless very energetic and efficient steps are at once taken to increase largely the number of mechanics and laborers employed …

Fisk trusted this warning on his part would "relieve me from the necessity of naming a force that must be kept at work at different points along the line by a designated day."[112]

Specifically, Fisk had observed that one of the abutments for the Town Creek Aqueduct had been laid, while "the foundation of the other abutment could be obtained at small cost."[113]

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109 *Ibid*., Nov. 19, 1847.
110 *Twentieth Annual Report* (June 5, 1848); *Proceedings of the President & Board of Directors*, G, pp. 285–286.
111 Harris to Fisk, Jan. 1, 1848 (Ltrs. Recd., Chief Engineer).
112 Fisk to Trustees, March 27, 1848 (Ltrs. Sent, Chief Engineer).
113 *Proceedings of the President & Board of Directors*, G, pp. 285–286.

Wednesday, March 15, was payday on the canal. The 400 to 500 men currently employed on the "50-mile section" thronged into Cumberland to spend their money on whiskey and women. Several of the foremen were heard to say that as soon as the weather permitted, more men would be added to the payroll and operations expanded.[114]

Subscribers to the Cumberland paper were cheered to learn on May 19 that work was "progressing under such circumstances as render it certain" that the canal will be completed by the fall. Wages on the canal for unskilled labor had risen to $1 per day. In response to these high wages, workers were migrating to the area.[115]

Once again, Chief Engineer Fisk and the editor viewed the situation differently. Fisk on June 21, after a trip to Town Creek, wrote the Trustees, "as the force upon the line still continues to be wholly inadequate to the completion of the work within" the time stipulated in the contract, it was his duty to require that by July 21 there should be employed on Aqueduct No. 10, "60 laborers, properly apportioned as masons, stone cutters, quarrymen and laborers. In addition to such force of teams, driver, etc., as may be requisite to keep them fully employed."

If this warning were ignored, Fisk would be compelled to advise the Trustees "to abandon the subcontract," unless good cause could be shown by Fraser & Co. for non-compliance.[116]

Fisk, in view of a report by Assistant Engineer John A. Byers that labor was plentiful along the line, did not feel that Fraser & Co. would encounter much difficulty in increasing their force.[117]

Meanwhile, Fisk had written the Trustees in reference to the quantity of stone MacFarland in November 1845, had estimated that would be needed to complete the Town Creek Aqueduct. MacFarland at that time had calculated that it would require:

30	perches, backing (limestone) delivered	
18	perches, backing (sandstone) delivered	
25	perches dressed rubble, delivered	$1.28
313	superficial ft. of ashlar, delivered	1.28
27	feet, linear, of skewback, delivered	2.63
5 1/3	feet, linear, of water table, delivered	1.28
14 4/7	superficial feet intrados & sheeting	1.28
18 3/8	superficial feet, soffit measurement of coping, delivered at the quarry in Virginia	
350 1/4	superficial feet of ashlar	1.04
145 3/10	superficial feet intrados & sheeting	1.75
50 1/2	feet, linear, of water table	1.04
77	superficial feet of coping	
2 3/4	perches of dressed rubble	

[114] Cumberland *Semi-Weekly Civilian*, March 17, 1848.
[115] *Ibid*., May 19, 1848.
[116] Fisk to Trustees, June 21, 1848 (Ltrs. Sent, Chief Engineer).
[117] Byers to Fisk, June 1, 1848 (Ltrs. Recd., Chief Engineer).

The prices quoted required a reduction in ratio of 100 to 82 to arrive at the August, 1845 prices.[118]

On July 5 Fisk wrote Dungan that he had "most strangely forgotten the plan of the waste weir etc. intended at Town Creek." For his assistant's guidance, Fisk pointed out that the "western abutment and wings" of the aqueduct would be constructed as though there was "no waste & waste weir." Consequently, the waste weir was to be built "entirely independent of, and, without any connection, with the aqueduct masonry."

Fisk would raise no objection of rock were excavated "along the site" of the waste weir, but, he cautioned, it would be well not "to go much if any below canal water surface." After this had been done, it would be possible to determine the proper position for the "center line of the masonry for the waste etc., and what could be the suitable level for its foundation."[119]

Dungan on July 10 notified Fisk that he had "laid out the ring stones for Aqueduct No. 10 on the platform in dimensions" on the Intrados as follows:

No.	Ft.	In
1	2	0
2	1	11½
3	1	11
4	1	11
5	1	10½
6	1	10
7	1	9½
8	1	9
9	1	8½
10	1	8

No.	Ft.	In.
11	1	7½
12	1	7
13	1	6½
14	1	6
15	1	5½
16	1	5
17	1	4½
18	1	4
19	1	3½
20	1	3
21	1	2½
Sum	34	0

Span 60 ft.—rise 15 ft.

Average of Intrados = 69.54 Radius = 37.5 feet
Average of Extrados= 74.51 Radius = 41.2809

Allowance for joints 3/16 of an inch each to be deducted from the dimensions as given.

Dimensions of ring stones on Extrados

No. 1	2.143	No. 6	1.964	No. 11	1.741	No. 16	1.518
2	2.098	7	1.919	12	1.697	17	1.473
3	2.053	8	1.875	13	1.651	18	1.428
4	2.054	9	1.831	14	1.607	19	1.384
5	2.009	10	1.785	15	1.563	20	1.340

[118] Fisk to Trustees, May 1, 1848 (Ltrs. Sent, Chief Engineer).
[119] Fisk to Dungan, July 5, 1848 (Ltrs Sent, Chief Engineer).

No. 21 = 1.294
36.427

Add .828 Key
37.255
74.510 = Extrados Average

Length of upper beds

No. 1	2.971	No. 6	2.835	No. 11	2.712	No. 16	2.604
2	2.943	7	2.809	12	2.689	17	2.584
3	2.916	8	2.784	13	2.667	18	2.565
4	2.888	9	2.759	14	2.645	19	2.546
5	2.861	10	2.725	15	2.624	20	2.528

No. 21 = 2.511.[120]

Chief Engineer Fisk, prior to his March inspection tour, had warned Fraser & Co. that he had heard that their progress was unsatisfactory. When he questioned the Fraser & Co. engineers, Fisk was disturbed to learn that they were unable "to carry on the work in the manner required." The company president informed Fisk that he wished to surrender the contracts.

To guard against additional delays, the Board of Directors determined to authorize Hunter, Harris & Co. "to receive back the contracts and to direct them to sublet the work without delay." In accordance with this decision, Locks Nos. 68–71 were "put in the hands of Fraser & Co." on the same terms as those previously negotiated with Gonder, Brayton & Co.

As the construction of the Town Creek Aqueduct required "more attention, energy and resources than any other work" on the "fifty-mile section," except the Paw Paw Tunnel, the Trustees determined to authorize Hunter, Harris & Co. to proceed at once with the work. On doing so, Hunter, Harris & Co. were to associate with themselves, if they wished "such suitable persons as they may find, the terms of payments to be the same as those of the late contract with Fraser & Co."

The Board of Directors of the Chesapeake and Ohio Canal Company were of the opinion that by this "arrangement the construction" of the Town Creek Aqueduct had been put on the "best possible footing."[121]

The editor of the *Semi-Weekly Civilian* continued to grind out favorable reports. On July 14, 1848, he informed his readers, "throughout the entire line of the Canal from Cumberland to Dam No. 6, the works of completion is surely and steadily progressing." While recent heavy rains and high water in the Potomac had slowed operations, damage at the construction sites was "trifling and the loss more in interruption than anything else." At the time that the newspaper went to press, work was being advanced with the "energy characteristic of the contractors and sub-

[120] Dungan to Fisk, July 10, 1848 (Ltrs. Recd., Chief Engineer).
[121] *Twentieth Annual Report* (June 5, 1848)

contractors, and all persons interested may rest assured" that the canal will be completed by the opening of navigation in the spring.[122]

On September 8 the readers of the Cumberland *Semi-Weekly Civilian* learned that Hunter, Harris & Co. had subcontracted Lock No. 67 and Culvert No. 215 to W. P. Sterritt. Hunter, Harris & Co. would retain the contract for the waste weir at Aqueduct No. 10. Little progress, however, had been made during the summer on the aqueduct. While one of the abutments had been laid, little work had been done on the other.[123]

During the annual "sickly season," a number of artisans and laborers were felled. Generally speaking, however, the stricken quickly recovers. With the coming of the first frost, the health of the workers improved, and operations were "pressed with renewed vigor." Progress had been less than anticipated, so the contractors began calling for additional hands. Commenting on this development, the editor of the *Semi-Weekly Civilian* wrote, "We do not know to what point the laborers of other States can more profitably turn at present than the Chesapeake and Ohio Canal."[124]

Christmas was almost at hand before any snow fell in Allegany County. Taking advantage of this situation, the contractors added more men to their payroll.[125]

Running a story on the Canal on December 29, the editor of the *Semi-Weekly Civilian* reported, a large quantity of cement, about 6,000 bushels per month, is used in the masonry work. This cement was required to be of the highest quality, as it had to take "a set in water almost instantaneous," and set as hard as stone. Most of the cement used by the contractors came from Reynolds' mill on Willis Creek.[126]

Once a month, on pay day, the workers along the "50-mile section" crowded the streets of Cumberland. On March 15, 1849, the editor of the newspaper learned from workers, who had thronged into town, that manpower was abundant on the canal, and that the contractors planned to press the work hard, "now that the season had opened." Unless there were some unforeseen developments, they predicted, the "50-mile section" would be ready for navigation by October 1. This news caused a number of boatyards to be opened. A leading Cumberland businessman was said to have signed a contract with the coal companies to boat 100,000 tons of coal to the District cities in 1850.[127]

The Cumberland *Semi-Weekly Civilian* carried an article on June 1 that the editor had been checking into reports that water would be admitted to the "50-mile section" by October 1. On doing so, he was delighted to see that over 1,200 men were at work. He learned from the artisans at Town Creek that "Aqueduct No. 10, which next to the Tunnel, is the heaviest work on the line,

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122 Cumberland *Semi-Weekly Civilian*, July 14, 1848,
123 *Ibid*., Sept. 8, 1848.
124 *Ibid*., Oct. 20, 1848.
125 *Ibid*., Dec. 22, 1848.
126 *Ibid*., Dec. 29, 1848.
127 *Ibid*., Mar. 16, 1849.

will be completed" in September. Contracts had been signed for the iron for the locks and railings for the aqueducts and Tunnel.[128]

Meanwhile, Chief Engineer Fisk was reporting to the stockholders that there were employed on the unfinished sections of the canal: 77 bosses, 39 blacksmiths, 54 carpenters, 75 drillers and blasters, 107 quarrymen, 59 stone cutters, 73 masons, 122 mason tenders, 6 brick moulders, 50 others engaged in making bricks, 16 bricklayers, 19 bricklayer tenders and 760 laborers; making all told 1,447 mechanics and laborers. In addition, there were 233 drivers, 562 horses, 26 mules and 6 oxen employed in driving and pulling 285 carts, 20 scoops, 13 ploughs, 11 two-horse wagons, 3 three-horse wagons, 28 four-horse wagons, 1 six-horse wagon, 5 one-horse railroad cars, 14 two-horse railroad cars, 10 three-horse railroad cars, 14 drays, 4 brick-moulding machines and several cranes.

The railroad cars were used on temporary tracks to remove rock and haul bricks and other materials at the Tunnel, and for the transportation of stone from quarries to Lock No. 58, the four locks below the Tunnel, the four locks near Oldtown, Aqueduct No. 10, and several other masonry structures. The length of the temporary railroad was nearly nine miles.

During the past year, $30,337 of work had been done on Aqueduct Nos. 8, 9 and 10, while an estimated $41,370 had yet to be done on these "works of art."[129]

On June 23 Assistant Engineer Dungan, after inspecting Aqueduct No. 10, told the contractor that the first course of sandstone must be taken up and replaced with "blue limestone" similar to that found in the face of the eastern abutment.[130]

Assistant Engineer Byers accompanied Dungan when he visited the aqueduct on September 11. While at the site, Byers told Dungan that the "short ring stones" were only 22 inches in length. On checking the specifications, Dungan found that they were to be not less than 24 inches long in a 70-foot span. He therefore presumed that it was not intended that they should be less in a span of 60 feet. The man in charge of the construction crew explained that Mr. Rhind had approved them, so Dungan felt that, "under these circumstances, we shall have to accept them."[131]

Five days later, when he again examined the aqueduct, Dungan saw that the ring stones had loosened "in such a manner as to require perhaps a pair or two of new ones to prevent making the key out of all proportion."[132]

On checking the cement, he found that Ellwood Morris, when he had been in charge of the Tunnel Division, had directed that two parts of sand be used with two of cement. At Aqueduct No. 10, the contractor had been using one to one. Questioning this practice, Dungan directed one of

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128 *Ibid*., May 11 and June 1, 1849.
129 *Twenty-First Annual Report* , June 4, 1849 (*Proceedings of the President & Board of Directors, C & O Canal).*
130 Dungan to Fisk, June 23, 1849 (Ltrs. Recd., Chief Engineer).
131 Dungan to Fisk, Sept. 11, 1849 (Ltrs. Recd., Chief Engineer).
132 Dungan to Fisk, Sept. 16, 1849 (Ltrs. Recd., Chief Engineer).

his assistants to "make some sets 1 to 1." When this was done, it was ascertained that the cement was so course that it set slowly.

Superintendent of Masonry MacFarland's younger brother, James, now reported to Dungan that by "washing he had found the concrete to be half sand or grains of cement." When the arch started to crack, Dungan, as an emergency measure, had three of the Queen posts propped and keyed. About 48 hours elapsed before this was carried out in what the engineers considered a satisfactory manner. This expedient proved satisfactory, because when he checked the arch again, there was "little if any more cracking."[133]

Subsequently, Dungan was informed that pebbles and gravel screened from the sand at the site of Aqueduct No. 10 would make better cement than broken stone. Dungan, however, was afraid that the pebbles, because of their "smoothness" might be objectionable.[134]

As had happened so often, expectations that the "50-mile section" would be opened for navigation by October 1, 1849, were dashed. Backers of the canal now hoped that the contractors would be finished by Christmas. On October 8 Chief Engineer Fisk notified Hunter, Harris & Co. that if water were to be admitted to the "fifty-mile section" by Christmas, they would have to increase their force to:

Works	Masons No.	Required Total	Number At Work
Lock No. 58 and bridge, and Aqueduct No. 9	9		
Waste weir on Section No. 291	2		
Lock No. 61 and Culvert No. 210	4		
Waste weirs on Section Nos. 298 and 312	8	51	18
Aqueduct No. 10	17		
Waste weirs on Section Nos. 333 and 341, and bridges on Section No. 346	6		
Aqueduct No. 11 and Locks Nos. 72–75	5		

The number of masons in all cases was "the actually working force required,"—no allowances being made for absentees.

As the masons at work on September 25 had to be more than doubled, so did the number of tenders, quarrymen, laborers and teams engaged in furnishing stone and materials for the masonry. This was especially true in regard to quarrymen, because for some time there had not been enough to keep the masons supplied with stone.[135]

Five days later, Fisk admonished Hunter, Harris & Co. that he was disappointed to learn that "there has been no increase, or if any, but very slight in the force employed upon the Town Creek Aqueduct and at the Tunnel" since the last meeting of the Board. At the present rate, it

133 Dungan to Fisk, Sept. 26, 1849 (Ltrs. Recd., Chief Engineer).
134 Dungan to Fisk, Nov. 28, 1849 (Ltrs. Recd., Chief Engineer).
135 Fisk to Hunter, Harris & Co., Oct. 8, 1849 (Ltrs. Sent, Chief Engineer).

would be April or May before these works were completed. Quarrying of stone for the aqueduct continued to lag.[136]

Dungan on a late November visit to Town Creek raised several questions. He wanted to know how the aqueduct was to be filled up to the grade over the arch, and what was to be done with the county road, as we are about to close up the embankment.[137]

Replying to Dungan's question about the county road, Fisk directed that it be realigned to pass under the aqueduct.[138]

Two of the Trustees, David and Hale, were in Cumberland at the end of November. Visiting with the Trustees, the editor of the *Semi-Weekly Civilian* learned that they were satisfied with the way construction was progressing. Both forecast that the canal would be "ready for the letting of the water, and the actual commencement of business on March 1, 1850."[139]

The winter of 1849–1850 was very severe in the mountains of western Maryland. On February 8 the readers of the *Semi-Weekly Civilian* learned that Hunter, Harris & Co. had a large number of hands at work in an effort to make up for lost time. Had this been a mild winter, the editor wrote, the "50-mile section" would have been ready for water as scheduled, but now it appeared that it would be April 1, at the earliest, before this portion of the ditch would be ready for navigation.[140]

On Washington's Birthday, February 22, the editor of the newspaper ran a story, detailing a conversation he had had with a man who had just returned from Town Creek. The traveler told the newspaperman that a large force was at work on all unfinished sections of the canal. In extending the date Hunter, Harris & Co. were to finish their work from December 26 to April 1, the Board of Directors had agreed to defer the "laying of the stone coping of locks, and some few other pieces of work, not necessary for the commencement of navigation … until after the admission of water, to facilitate the transportation of the materials, which are to be brought from a distance.[141]

On March 1 Dungan wrote Fisk, as for Aqueduct No. 10, "I feel there will be a saving even if we build the entrance walls" to plans and specifications. To complete the aqueduct within the next 60 days would require a force twice the size of the one currently employed. A "reasonable increase" in manpower would enable the contractors to do all that was necessary to admit water by the target date, April 1.[142]

Reinforcements were not forthcoming, and to add further difficulties Hunter, Harris & Co. ran out of money. Pay day came and there was no money for the artisans and laborers. This led to labor troubles. On April 9 the men working on the Oldtown locks struck, and came marching

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136 Fisk to Hunter, Harris & Co., Oct. 13, 1849 (Ltrs. Sent, Chief Engineer).
137 Dungan to Fisk, Nov. 24, 1849 (Ltrs. Recd., Chief Engineer).
138 Lowe to Spates, June 7, 1862 (Ltrs. Recd., C & O Canal Co.).
139 Cumberland *Semi-Weekly Civilian*, Nov. 30, 1849.
140 *Ibid*., Feb. 8, 1850.
141 *Ibid*., Feb. 22, 1850.
142 Dungan to Fisk, Mar. 1, 1850 (Ltrs. Recd., Chief Engineer).

down the towpath from Lock No. 68 with a flag. A letter was handed to one of Dungan's men that evening, notifying him that all hands from Cumberland to Town Creek had ceased work and were determined to "prevent the completion of the canal till" they had received their back pay for the period, January through March. The people at the Tunnel were asked to join the strikers.

A storm kept the strikers in their shanties on the 10th, so there was no trouble. Dungan, concluding that the strikers would use the day to recruit, wrote Fisk urging steps be taken to prevent another march by the disgruntled workers, before the strike spread to the men employed on the Tunnel.[143]

On the 12th the "rioters" were out in force, and they marched down from Oldtown to Section No. 325, where they halted all work and their leaders (Alexander Christy, George Carder and McDonald) threatened to push on to the Tunnel. Dungan was delighted to see that the men working on Aqueduct No. 10 were "disposed to resist the rioters, and if they were compelled to give way to fall back to the Tunnel."[144]

Dungan on April 22 warned Fisk that if the men were not paid by April 30, there would be a strike that would put a stop to all work along his division.[145]

Two days later, the men at the Tunnel walked out and marched down to Lock No. 61, stopping all hands as they did.

When he questioned the leaders, they told Dungan that they expected the bondholders to "pay the arrears to insure the completion of the canal." They would, the strikers remarked, hold "peaceable possession making no threats."

Piper, one of the foremen, promised to get the men back to work on Monday. Dungan, however, feared that he would be unable to make good on his promise. If the strikers did not return to their jobs shortly, it was feared that the rest of the hands would soon walk off.[146]

To get the strikers back on the job, the Trustees (Davis, Hale and Allen) took over the contract on assignment from Hunter, Harris & Co., and resumed work. Even before the labor difficulties reached their climax, Chief Engineer Fisk had notified the Trustees that the "failure of Hunter, Harris & Co. to carry through the work to completion in their own name has occasioned delay, thereby postponing the time when the navigation can be opened to Cumberland." Fisk now estimated that water could be let into the upper ten miles of the canal by May 15, into an additional 18 miles by June 1, and into the entire "50-mile section" by June 15.[147]

Bad weather (a succession of snow, sleet and rain storms), along with the labor difficulties, knocked Fisk's predictions into a cocked hat. On June 3 the stockholders were informed that work had progressed to a point where water would be "admitted to the first ten miles of the ca-

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143 Dungan to Fisk, Apr. 10, 1850 (Ltrs. Recd., Chief Engineer).
144 Dungan to Fisk, Apr. 13, 1850 (Ltrs. Recd., Chief Engineer).
145 Dungan to Fisk, Apr. 22, 1850 (Ltrs. Recd., Chief Engineer).
146 Dungan to Fisk, Apr. 25, 1850 (Ltrs. Recd., Chief Engineer).
147 Fisk to Trustees, Apr. 15, 1850 (*Proceedings of the President & Board of Directors, C & O Canal).*

nal, from Cumberland to Lock No. 72 below the Narrows, early next week." In three or four weeks, water should be let into another ten miles, and by doubling the laboring force, all work necessary for admission of water to the entire "50-mile section" could be accomplished by July 1.

At the time of the last semi-monthly return, the force working on the canal consisted of: 37 bosses, 7 blacksmiths, 70 carpenters, 22 quarrymen, 10 stone cutters, 20 masons, 33 mason tenders and 413 laborers. In addition, there were 104 drivers, 215 horses, 15 carts, 14 two-horse railroad cars, 4 three-horse railroad cars and sundry wagons, ploughs, etc.[148]

Meanwhile, Dungan had "arranged a dry wall extending 100 feet above and below" Aqueduct No. 10 "changing from plumb to a 2 to 1 slope in 80 feet, being a change of 6 inches every 20 feet founded 2.0B and rising 6.0A, in all 128 perches." This wall, Dungan reported to Fisk, may be "heavier than you wished."[149]

One of Fisk's predictions finally turned out to be correct. On June 11 water was let into the canal at Cumberland for the purpose of testing the banks. When the *Semi-Weekly Civilian* went to press on the 14th, the editor boasted, "the first level of eight and a half miles from this place is now covered with water. The water has also been let in on the levels near Oldtown, and we hope soon to be able to announce that the canal is ready for navigation throughout its entire length.[150]

One of the Trustees, Hale, accompanied Dungan to the Town Creek Aqueduct at the beginning of the second week of July. While there Hale put a stop to the pointing. On the 10th Dungan told his assistant, Clarke, to "thoroughly examine the joining of the concrete to the parapet walls and have the angle well pointed to receive the sand," which was to be screened before being put on. All told, about 50 cubic yards were involved.[151]

Fisk about this time notified President Coale that if water were to be admitted to the canal below the Narrows on July 15, there had to be done at Aqueduct No. 10 and its adjoining waste weir:

> 80 perches of masonry.
> 25 cubic yards of sand in the trench.
> The inner rail had to be delivered and set.
> 10 cubic yards of puddling.
> 100 cubic feet of timbers in coping, over all.
> 900 superficial feet (2-inch) plank, over all.
> 5 perches grouted filling, over all.
>
> Construction of roading under the aqueduct.
> Pointing one-half the aqueduct.
> Painting the inner railing.[152]

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148 *Twenty-Second Annual Report*, June 3, 1850 (*Proceedings of the President & Board of Directors*, C & O Canal).
149 Dungan to Fisk, May 20, 1850 (Ltrs. Recd., Chief Engineer).
150 Cumberland *Semi-Weekly Civilian*, June 7 & 14, 1850.
151 Dungan to Fisk, July 12, 1850 (Ltrs. Recd., Chief Engineer).
152 Fisk to Coale, undated (Ltrs. Sent, Chief Engineer).

Meanwhile, the time limit for the completion of the canal had been extended to July 1 and then to August 1. It was all in vain, however, for in July the Trustees' resources had been exhausted and work again stopped. The Board promptly declared the contract abandoned and negotiated a new one with Michael Byrne of Frederick County providing for the completion of the canal for $3,000 cash and $21,000 in bonds. Reporting this development, the *Semi-Weekly Civilian* commented, "As Byrne is an old and experienced contractor and possessed of ample means, there can be little doubt that the work will be finished at the time designated.[153]

By August 25 work on the Tunnel Division had progressed to the point where Dungan was able to report that "we will be ready to receive water at … [Lock No. 66]." All sections under his jurisdiction, except No. 328, would be ready to receive water on the 26th. Reinforced by the people he had sent, Dungan felt certain that the crew at Section No. 328 would be ready for water by Tuesday evening.[154]

A little before 11 a.m. on the 31st, Dungan had the upper gate at Lock No. 67 opened. By 12:30 the water had reached Lock No. 66, and by 2:25 a.m., on the 1st, it was at the waste weir on Section No. 312. The only leak reported was a slight one at the Tunnel, while the observer at Aqueduct No. 10 reported no leaks.[155]

Fisk, on learning that Dungan had admitted water to his division, wrote him from Cumberland that he would prefer that "neither the Tunnel or Town Creek level should be filled so much, if any, exceeding 4 or 4½ ft. before tomorrow.[156]

At this time, the only "works of art" not completed on the "50-mile section" were those in Seven-mile Bottom: they were Locks Nos. 58–60, and the waste weirs on Section Nos. 282 and 288.[157]

Dungan on September 26 notified Fisk that the Seven-mile Bottom section of the canal was ready for water. As it was overcast, he felt that a good supply would soon be received from the heavens. On the previous day he had taken measurements, which showed 5½ feet of water on the Town Creek level, and still there were no leaks in the recently completed aqueduct.[158]

It was October 8, however, before water was let into the Seven-mile Bottom section.[159]

The eastern portion of the Chesapeake and Ohio Canal, the only part to be completed, was formally opened to trade at Cumberland, Thursday, October 10, 1850. Preparations for ceremonies, appropriate to the occasion, had been underway doe some time. On the day before the opening, invited guests and curious visitors began arriving from all parts of Maryland, Virginia and the District of Columbia. Among the invited guests were: President Coale; members of the Board of

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153 Cumberland *Semi-Weekly Civilian*, Aug. 2, 1850
154 Dungan to Fisk, Aug. 25, 1850 (Ltrs. Recd., Chief Engineer).
155 Dungan to Fisk, Sep. 1, 1850 (Ltrs. Recd., Chief Engineer).
156 Fisk to Dungan, Sept. 2, 1850 (Ltrs. Sent, Chief Engineer).
157 Bender to Fisk, Sept. 10, 1850 (Ltrs. Recd., Chief Engineer).
158 Dungan to Fisk, Sept. 25 & 26, 1850 (Ltrs. Recd., Chief Engineer).
159 Bender to Fisk, Oct. 8, 1850 (Ltrs. Recd., Chief Engineer).

Directors, John Pickell, W. Cost Johnson, W. A. Bradley, George Schley, and S. P. Smith; former governor, Michael Sprigg; State Agents, Tench Tilghman and J. Vanclear; former senator, W. A. Merrick; J. L. Skinner, editor of *The Plough, the Loom, and the Anvil*; Mayor H. Addison of Georgetown.

Colonel Pickell brought with him from Baltimore the band of the Independent Blues. Following their arrival, the bandsmen appeared at the portico of the U. S. Hotel and "electrified an immense multitude of our citizens with their unsurpassed instrumental performance."

Thursday "dawned upon the mountain in all the richness of the early autumn, and it was evident shortly after the sun had risen above the hills that the inhabitants were prepared to do honor to the new epoch in their history." Ceremonies got started at an early hour. By 8:30 a crowd had assembled in the streets before the U. S. and Barnum's hotels. The Eckhart Artillery, a local militia unit, soon arrived with two handsome field pieces, and "performed various military evolutions in a manner that would have done credit to a veteran corps."

At 9 a.m. the parade was formed, with the Eckhart Artillery in the van, escorted by the band of the Independent Blues. Behind the guns and cannoneers marched the distinguished visitors, officers of the Canal Company and state agents. Next, came the Cumberland military units and citizenry, followed by an immense throng of residents of Allegany County, while the Mechanics Band of Cumberland brought up the rear. The procession marched through the streets toward the canal locks, gathering strength as it advanced "to the inspiring strains" of martial music. By the time the parade had reached the locks, there was an "immense assemblage of all ages and sexes, congregated to do honor to so proud an event in the history of Allegany County."

At the outlet locks of the canal, the ceremonies were opened by passing "five canal boats, laden with the rich products of the mines of Allegany, and destined for Eastern Markets, … through the locks amid the salvos of artillery from the Eckhart company, accompanied by the brilliant performances of the bands."

After a long speech of welcome by Mayor William Price of Cumberland and of eulogy by President Coale, the official guests, officers of the Company, and a large number of citizens boarded the canal packet *Jenny Lind* and the newly outfitted canal boat *C. B. Fisk* for a short run down the waterway. Another procession was formed, this time composed of canal boats. Following the two lead vessels was another with the Eckhart Artillery, and bringing up the rear were the five coal boats, *Southampton, Elizabeth, Ohio* and *Delaware* belonging to the Merchants Line, and the *Freeman Rawdon* owned by the Cumberland Line. The bands provided music for the trip, while the gunners of the Eckhart Artillery fired occasional salutes.

At a large spring, 10 miles below Cumberland, the vessels stopped for a banquet, while the five coal boats continued their run down the canal. After partaking of an "abundant collation … to which zest was imparted by a copious supply of the finest and choicest wines," the visitors returned to Cumberland, where another banquet was given by the townspeople.[160]

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[160] Cumberland *Civilian*, Oct. 14, 1850.

Before the coal boats had left Cumberland, their owners were warned by Chief Engineer Fisk that their vessels could not, "because of low water," get through to Dam No. 6, if they drew more than 3½ feet of water. The vessels had been loaded with this in mind.

On Tuesday (the 15th) the *Southampton, Freeman Rawdon* and *Elizabeth* succeeded, after much difficulty, in passing Dam No. 6. The first two then raced for the honor of being first to reach Alexandria. Horses and mules were requisitioned along the way to maintain speed, the *Elizabeth* had stopped at Williamsport to unload her cargo, while the *Delaware* and *Ohio*, being too deeply laden, were unable to pass one of the levels and had been moored several miles above Dam No. 6.[161]

The *Freeman Rawdon* won the race with the *Southampton*, reaching Alexandria on the evening of October 17. On their arrival, the vessels were received by a "great crowd and 100-gun salute."[162]

[161] *Ibid*., Oct. 18, 1850.
[162] *Ibid*., Oct. 25, 1850.

CHAPTER III: TOWN CREEK AQUEDUCT: 74 YEARS OF SERVICE

The Town Creek Aqueduct was giving good service in 1853, when General Superintendent T. L. Patterson informed the stockholders that all "aqueducts are in good condition, and require no repairs."[163]

Lloyd Lowe, who was engineer in charge of the Cumberland Division, notified General Superintendent A. K. Stake, on May 12, 1856, "we will commence on Monday (the 12th) to put the railing at the Aqueducts."[164]

Two weeks later, Lowe reported, "I shall have railings on the Town Creek Aqueduct this week; the work upon the others is considerably advanced."[165]

Stake on June 15 forwarded a report that the "railing has been put on the Town Creek Aqueduct; this week that at Evitts Creek will be put on, and the necessary timber will soon be ready for Licking Creek and Fifteen-mile Creek Aqueducts."[166]

On June 25 Superintendent Stake wrote the President and Board of Directors, "Sometime during the past summer orders were given … to have railings, of a cheap character, placed upon the inner edge of the coping of the different Aqueducts on the line. This order has been carried out upon most of the divisions, and arrangements made to have it carried out upon them all, the railing alluded to is a decided improvement, and adds both to the appearance of the work and to the security of passing teams."[167]

The Allegany County Commissioners in June, 1862, contacted Lowe in regard to the roads passing under the Town and Fifteen-mile Creek Aqueducts. Lowe explained to the Commissioners that he was uncertain of the Company's obligation in keeping these roads up, as it was impossible to effect any improvements that would not be washed out every time there was a freshet. To cope with this situation, Lowe had suggested that the road under the Fifteen-mile Creek Aqueduct be abandoned and a ferry substituted. At Town Creek, the old road under the aqueduct would be given up, and a new one put in near the culvert, which would cross the stream one-mile above the aqueduct. The Commissioners were non-committal, but indicated they might be willing to release the Company from its "obligations in regard to these roads for a small consideration."[168]

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163 *Twenty-fifth Annual Report* (Washington, 1853), p. 6.
164 Lowe to Stake, May 12, 1856 (Ltrs. Recd., C & O Canal Co. Papers).
165 Stake to Ringgold, May 26, 1856 (Ltrs. Recd., C & O Canal Co. Papers).
166 Stake to Ringgold, June 15, 1856 (Ltrs. Recd., C & O Canal Co. Papers).
167 Stake to President & Directors, June 25, 1856 (Ltrs. Recd., C & O Canal Co. Papers).
168 Lowe to Stake, June 7, 1862 (Ltrs. Recd., C & O Canal Co. Papers).

In March 1863, the Commissioners gave the Company permission to relocate the county road passing under the Town Creek Aqueduct, provided the Canal Company would build the road. The Company accepted the proposal and budgeted $300 for the project.[169]

Unlike several of the Company's "works of art," the Town Creek Aqueduct escaped damage during the Civil War. General Superintendent Charles P. Manning on June 4, 1866 reported, "In general the masonry of the aqueducts, culverts and locks is both substantial and in good repair." The only exception, he observed, was the aqueduct spanning the Conococheague Creek, which had been "wantonly and most seriously injured by the rebel soldiers" during the Civil War.[170]

Three years later, the canal stockholders were advised that since 1859 "little or nothing" had been done toward repairing and "improving lock-houses, bridges, culverts, aqueducts, locks, lock-gates and waterways of the Company." Consequently, many of them had deteriorated to the point where they were "becoming worthless," thus making it essential that they be repaired. During the past year, at heavy cost, the Board of Directors had seen that extensive repairs were made, and now the canal presented "a comfortable and substantial condition." Little money for the upkeep of the canal would have to be disbursed in Fiscal Year 1870, provided there were no unforeseen disasters.[171]

Chief Engineer William R. Hutton in May, 1870, undertook an extensive survey of the condition of the canal. When he filed his report, he observed, Aqueduct "No. 10, at Town Creek, is … in good condition except as to leaks."[172]

In 1873 Engineer T. L. Patterson, on making a tour of inspection, found that most of the "aqueducts have been leaking more or less for years past; the consequence of which, owing to the freezing of water in the interior of the walls, has been a greater or less injury to their berm parapets and spandrills." This injury to the Seneca and Tonoloway Aqueducts had been so great that it would be necessary to take down and rebuild a portion of their berm sides.[173]

E. Mulvany, engineer in charge of the Second Division, on January 1, 1886, reported, "The masonry work at many places is in need of repair. Most of the aqueducts including the Town Creek are badly cracked and mortar worked out of the joints and there is considerable leakage which will have to be attended to during the suspension of navigation."[174]

Two years later, on December 24, 1887, Mulvany again complained, "The aqueducts on the division leak considerable, some of the walls are very much bulged and cracked."[175]

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169 Lowe to Ringgold, March 28, 1863 (Ltrs. Recd., C & O Canal Co. Papers).
170 *Thirty-eighth Annual Report of the President and Directors of the Chesapeake and Ohio Canal to the Stockholders, June 4, 1866* (Washington, 1866), p. 7.
171 *Forty-first Annual Report …* (Georgetown, 1869), pp. 4-5.
172 *Forty-second Annual Report …* (Annapolis, 1870), p. 34.
173 *Forty-fifth Annual Report …* (Annapolis, 1873), p. 28.
174 *Fifty-eighth Annual Report …* (Annapolis, 1886), p. 25.
175 *Sixtieth Annual Report …* (Annapolis, 1888), p. 30.

Unfortunately, no documents have been uncovered that would cast light on steps that might have been taken at the Town Creek Aqueduct to correct the deficiencies of which Mulvany complained.

After the flood of 1924 had provided an opportunity for the Baltimore & Ohio Railroad to relieve itself of the expense of operating the canal, the waterway fell into disrepair. At the time that a study of the canal was made for the 81st Congress, the investigators reported that the Town Creek Aqueduct is "a single-span arch. The upstream spandrel has partially failed and requires reconstruction. The downstream spandrel and arch barrel are in good condition and should require little repair."[176]

[176] *Chesapeake and Ohio Canal Report …* 81st Congress, 2nd Session, House Document No. 687 (Washington, 1950), pp. 71–72.

APPENDIXES

APPENDIX A

1837

SPECIFICATION FOR AQUEDUCTS

OF ONE ARCH.—Segment of a Circle,

On the Chesapeake and Ohio Canal.

The center of the waterway of the aqueduct will be 4½ feet on the towpath side of the center of the canal, of 30 feet bottom and 54 feet water surface.

The foundation of the abutments and of all masonry to the very end of the wings, will be rock, taken down by blasting to a level one foot lower than the adjoining firm rock. The foundation, if not an entire level, shall be in level offsets, such as the Engineer shall approve of.

The dimensions of the abutments measured on a level with the spring of the arch will be in length 33¼ feet, with the addition of one inch batter to the foot at each end of the abutments, for the height of water line of the canal above the spring of the arch, and the thickness of the abutments on the same level will be twelve feet.

The front of the abutments will be plumb—the ends will batter one inch to the foot; and the back of the abutments will batter six inches to the foot. In addition to the above dimensions, there will be an offset around the front and ends of the abutments of one foot at the level of low water of the river.

From a point twelve feet back of the front line of the abutments at the level of the canal water line, shall commence the splay of the wings. The splay shall be two feet at right angles, to one foot in the direction of the canal. This splay on the berm side of the canal shall continue out (on the same level—of canal water line,) to a point 38½ feet from the center of the abutment, and on the towpath side 41½ feet out; at these two points, viz: 38½ feet and 41½ feet from the center of the abutments, the direction of the wings shall change into lines parallel to the direction of the canal—the top outer edges of these parallel wings at the level of the canal water line being eighty feet apart.

The termination of the wings, on the same level as above spoken of (viz: the water line of canal) will generally be 45 feet from the front line of the abutments.

The angles formed by the wings and the ends of the abutments at the point where the splay of the wings commences, shall be filled in with masonry battering one inch to the foot, so as at the level of canal water line to be embraced within two straight lines, each four feet in length, and at right angles to each other, one being at right angles and the other, of course, parallel to the aqueduct.

The width of the wings at the level of canal water line shall be five feet; they shall have a batter of two inches to the foot on the inside and at their ends, and on the outside they shall have a batter of one inch to the foot: —corresponding to the one foot projection of the front and ends of the abutments, the same projection of one foot shall be carried around the angles of masonry at the

commencement of the splay of the wings, and along the splay of the wings, and still further along to the termination of the wings.

ARCH.

The arch for a span of *seventy feet, and for a rise of fourteen feet*, will be three feet at the spring and two feet eight inches at the crown; and for other spans will be proportional.

The top of the arch at the intrados shall be five feet below the bottom of the canal.

The arch from out to out at the intrados of the top of the arch shall be, exclusive of the rustication, thirty-four feet ten inches.

The ends of the arch shall have a batter of one inch to the foot.

The arch will be formed of stone perfectly cut throughout; the beds of the sheeting must be true and as accurately cut back to the line of the extrados as in any other part; the joints shall be full and even, and shall fill the square back to the extrados; the extrados of the arch shall be hammered to a true surface. It will be understood, therefore, that the intrados, the end joints, and the bed of all the sheeting will, in every point, fill the space necessary to make the whole arch as compact and solid as though it were of one stone. The skewbacks, also, shall be as well cut as the sheeting, and will be of the size deemed necessary by the Engineer. The ring-stones shall be alternately long and short. The length of the short one shall not be less than two feet, and of the long one not less than four feet. The sheeting shall not be less than three feet, with no break less than eighteen inches. The sheeting shall all be numbered, so that the place of each stone may be known immediately upon its being cut.

The inner arris and the outer arris of the sheeting will have a half inch taken off and carried through the arch.

The patterns for the ring-stones shall be made subject to the approval of the Engineer, at the cost of the Contractor.

The ring-stones shall have a rustication of one and a half inch; which rustication shall project outside the spandrel walls.

The sheeting for an arch of *seventy feet span* may be in courses between two feet and fourteen and a half inches in thickness, (and in proportion for other spans,) so arranged as the Engineer shall approve of after the opening of the quarry.

No checking of the sheeting is allowed.

SPANDREL WALLS.

The towpath and berm spandrel walls, at bottom of the canal, shall each be seven and a half feet wide. They will have on the outside a batter of one inch to the foot—conforming to the end batter of the arch and abutments. They shall each batter on the inside three inches to the foot down to the solid filling in, or backing in over the arch; which backing in of the arch will now be more particularly described, viz:

From the level of the spring of the arch, where the abutments are twelve feet wide, the six inch batter of the back of the abutments will be changed to a two inch batter, which will be continued

up between the wings and spandrel walls to within six feet of canal bottom—the batter will then change from two inches to the foot, to a foot to the foot, up to within four feet of canal bottom—this level of four feet below canal bottom shall be the height of the back part of the filling in over the arch; from this back part the top surface of the filling in shall have no inclination that, at the point where it meets the extrados of the arch, it shall be five feet below canal bottom.

PARAPETS.

The towpath parapet shall be seven feet six inches wide, and the berm parapet shall be five feet six inches wide at canal bottom—they shall be plumb on the inside, and shall batter on the outside one inch to the foot; this will make the towpath parapet seven feet wide and the berm parapet five feet wide at canal water line.

COPING.

The parapets shall be covered with coping one foot in thickness—the bottom of the coping being placed on a level with canal water line. The coping will be well scabbled on its lower and upper surfaces, and shall have full joints, *well cut*, the inner edge, also, of the coping shall be well cut, the outer edge shall be scabbled. The coping shall project outside of the parapets one foot, and shall extend over the whole breadth of the parapets, from end to end. The coping over the towpath parapet may be alternately in two and three pieces, and on the berm side in one and two pieces; so arranged as to dimensions as shall, in the opinion of the Engineer, form the best bond. The wing coping, including the one foot projection, will be three and a half feet wide.

Each piece of coping shall be connected to each other piece against which it lies by a two inch square dowel, six inches in length, let down diagonally in the joints between the stones, and leaded.

WATER TABLE.

It shall extend from end to end of the wings. It shall run back into the wall two feet; shall project eight inches, and shall be in thickness nine inches; beveled off on its upper surface so as to face only seven and a half inches—this bevel of one and a half inch to be made in the outer seven inches.

The water table shall be full in all its dimensions, beds, and joints, and shall be well scabbled except the joints, which shall be truly cut back the full depth of the stone.

The upper surface of the water table will be level with the bottom of canal.

The inside of the *parapets* shall be well and truly cut. The dimensions of the headers and stretchers for which, and their relative number, shall be the same as is required for the ashlar in the lock specifications for the locks about to be put under contract, (in August 1837,) on this canal. The only difference being that for the inside of the parapets the stone are to be *cut* while the lock ashlar are to be scabbled.

CUT WORK.

The *coping*, the *water table*, the *sheeting*, the *skewbacks*, and *two feet in depth of the inside of the parapets* will be considered and paid for as *cut work*.

All the rest of the masonry will be of *good rubble masonry*, well bound together, with the corners of the abutments and the angles of the wings formed of large and well scabbled stones.

The front and back of all the masonry will be laid in full beds of mortar, and the interior will be grouted; and the mortar and grout, and everything connected with the cement and sand, shall be the same as is required in the lock specifications; and the transportation of cement shall in like manner be paid for by the Company.

The back of all the masonry against or over which the embankment will rest shall present a smooth and even surface, well plastered over.

It is understood that the regulations as to embanking in against the abutments, and as regards the puddling will be precisely the same as in the lock specification that has been referred to.

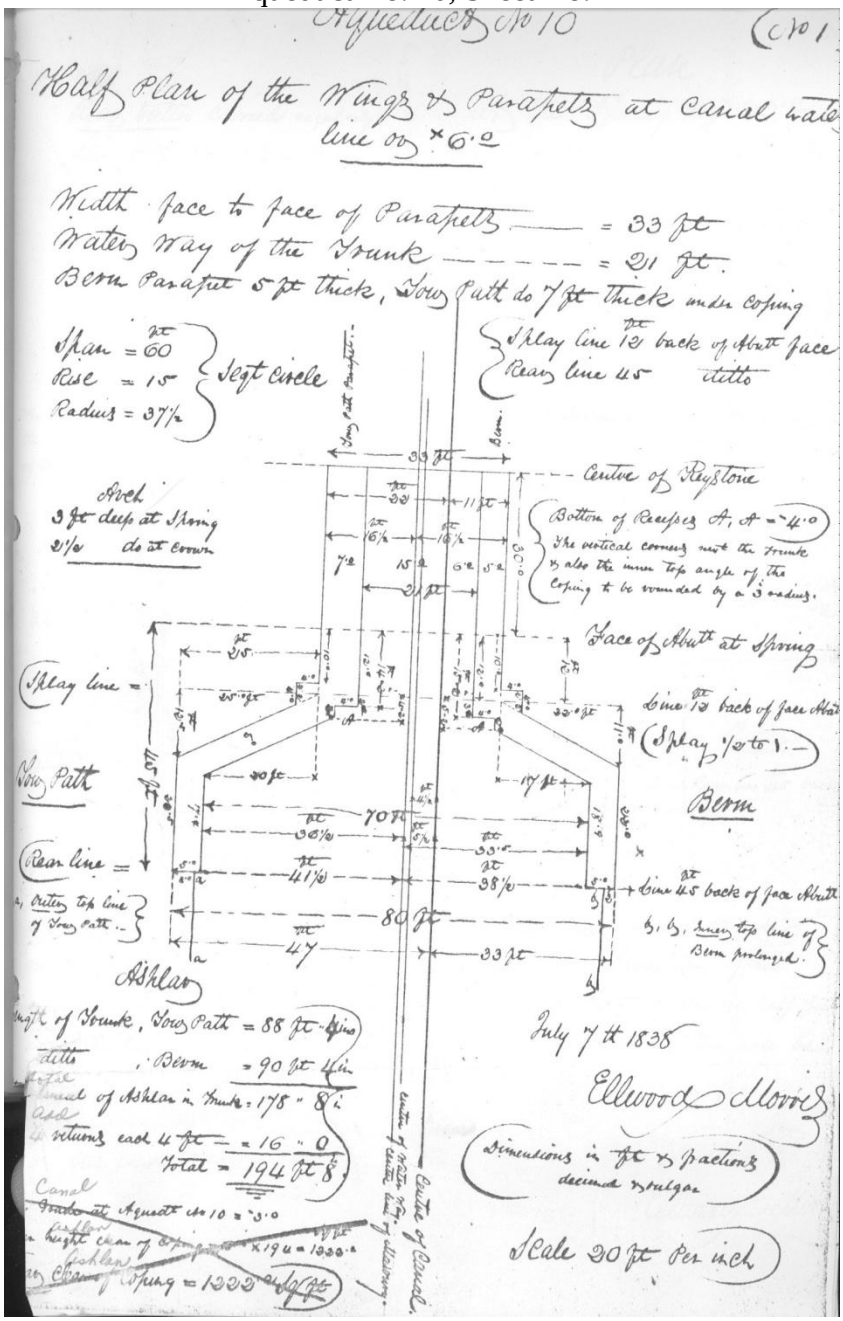
The centers shall be upon a plan approved of by the Engineer.

APPENDIX B

AQUEDUCT NO. 10

Plans prepared and Signed by Ellwood Morris on July 7 and 11, 1838.

Aqueduct No. 10, Sheet No. 1



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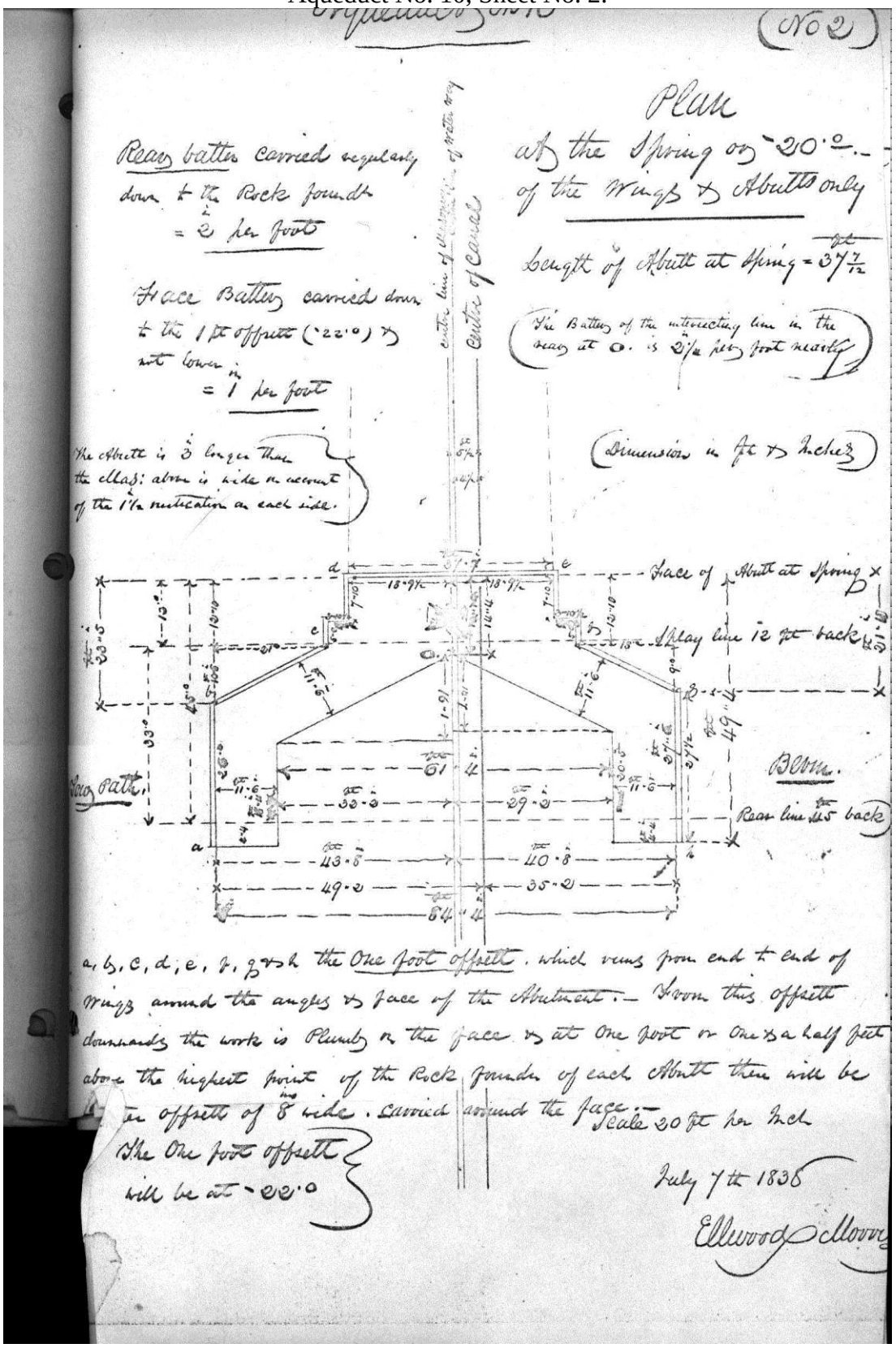

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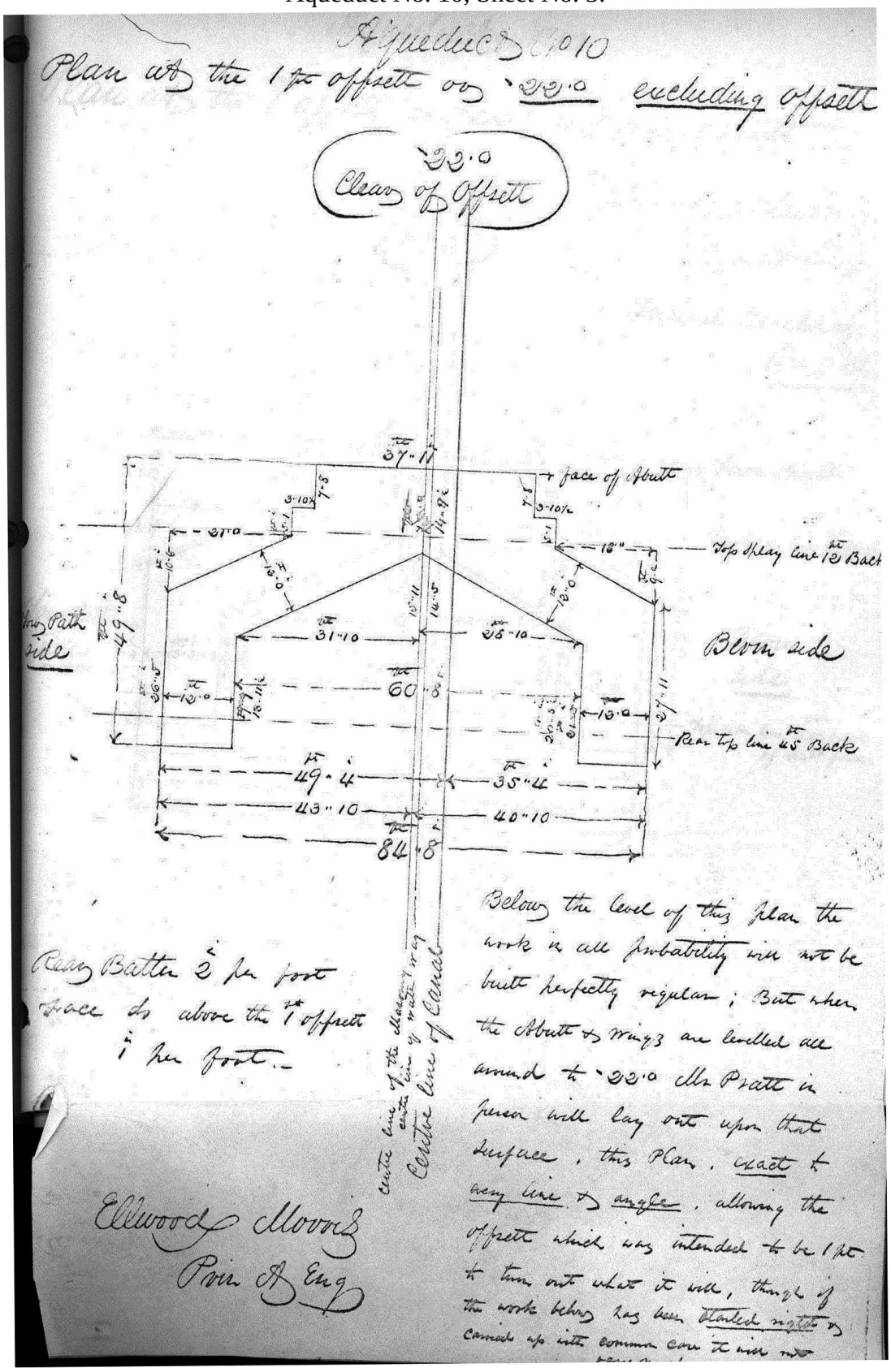

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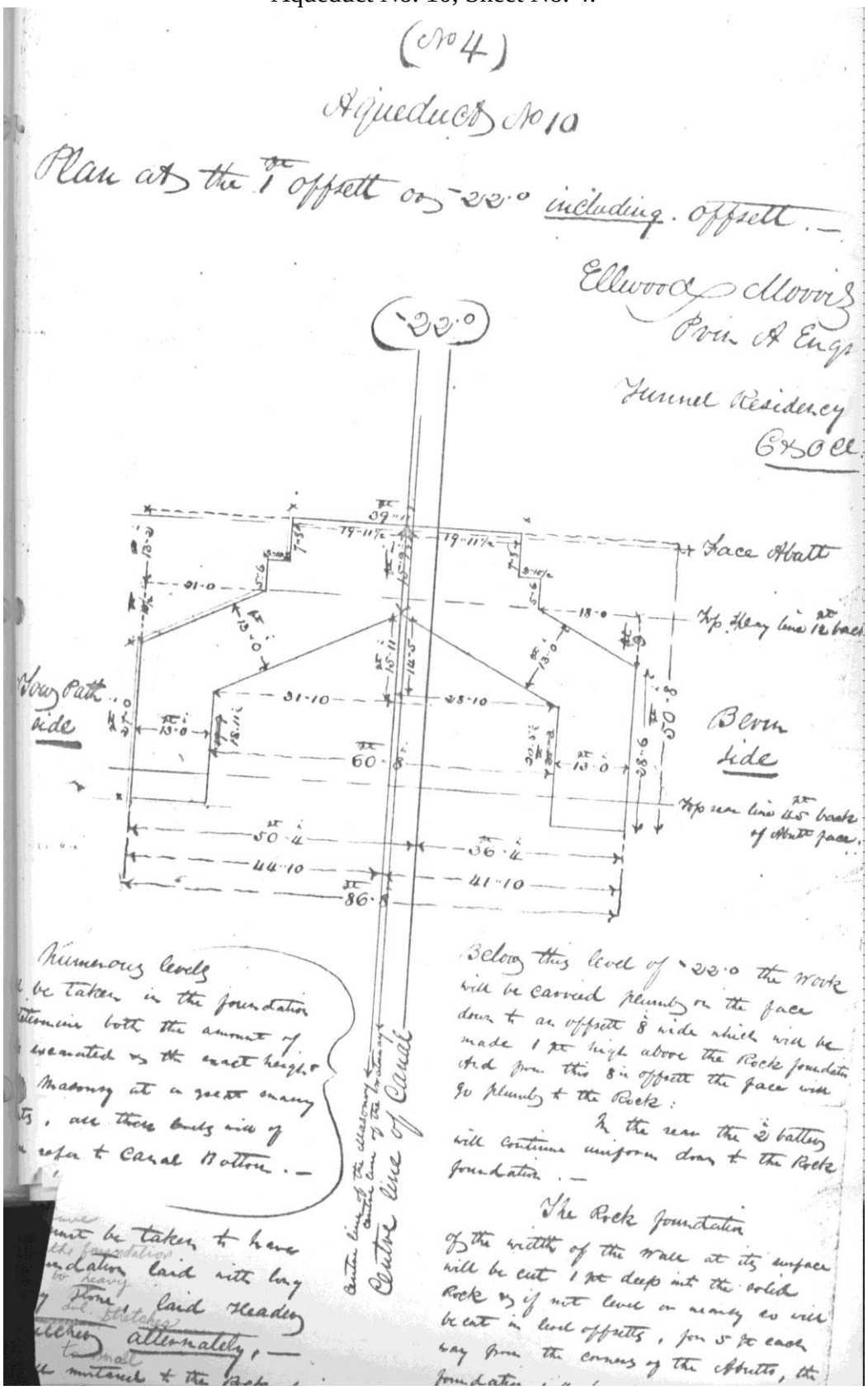

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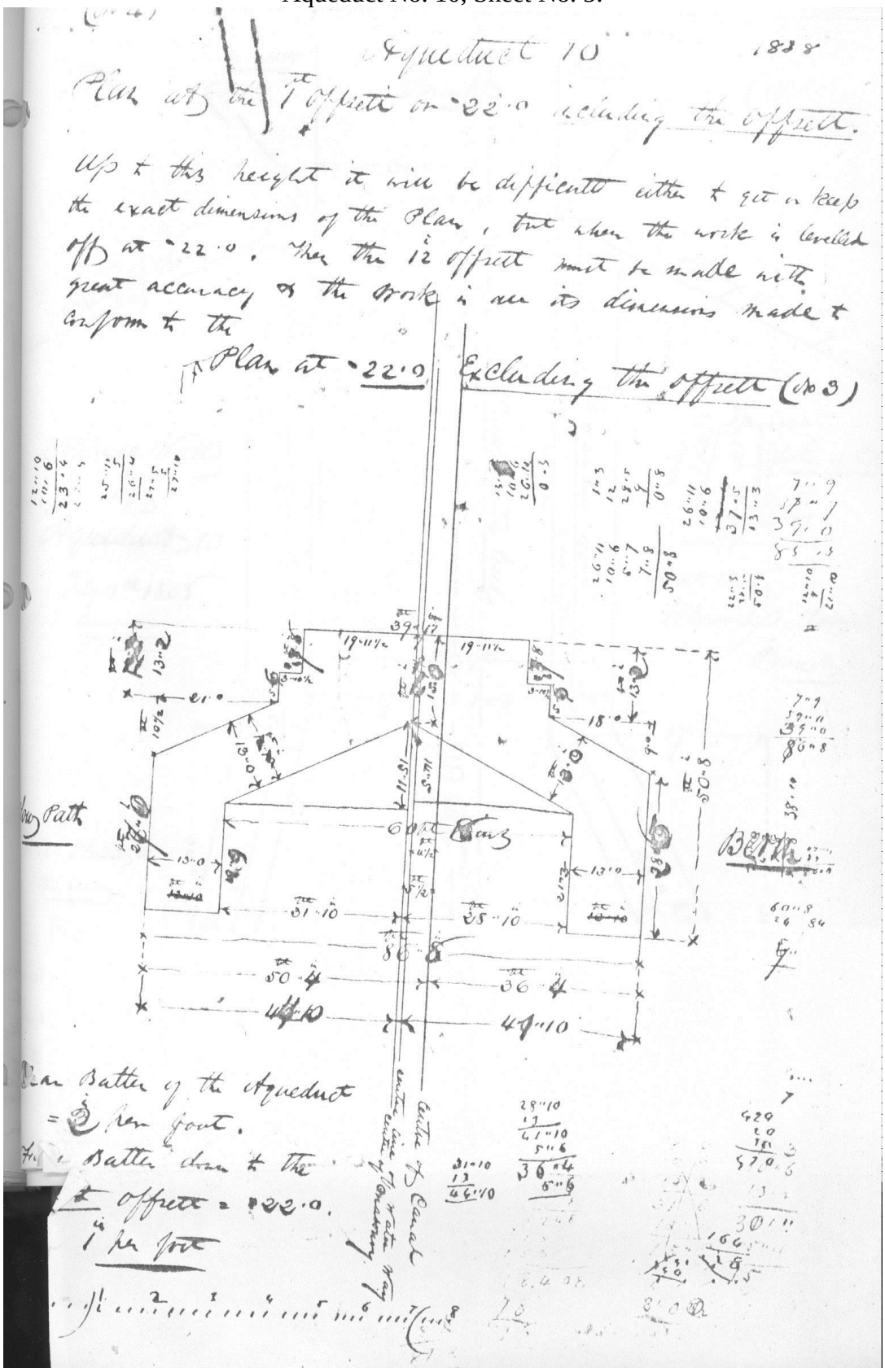
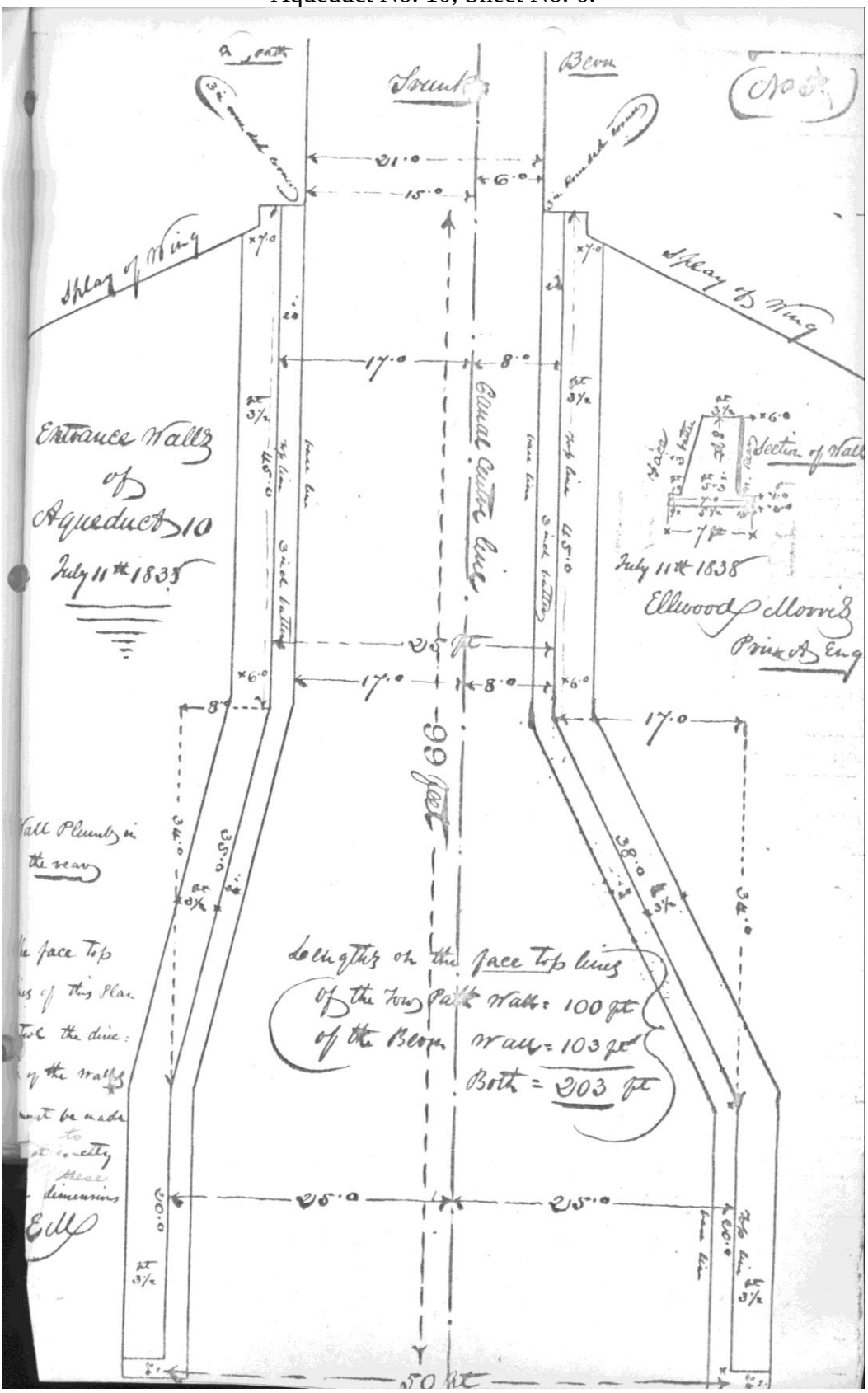
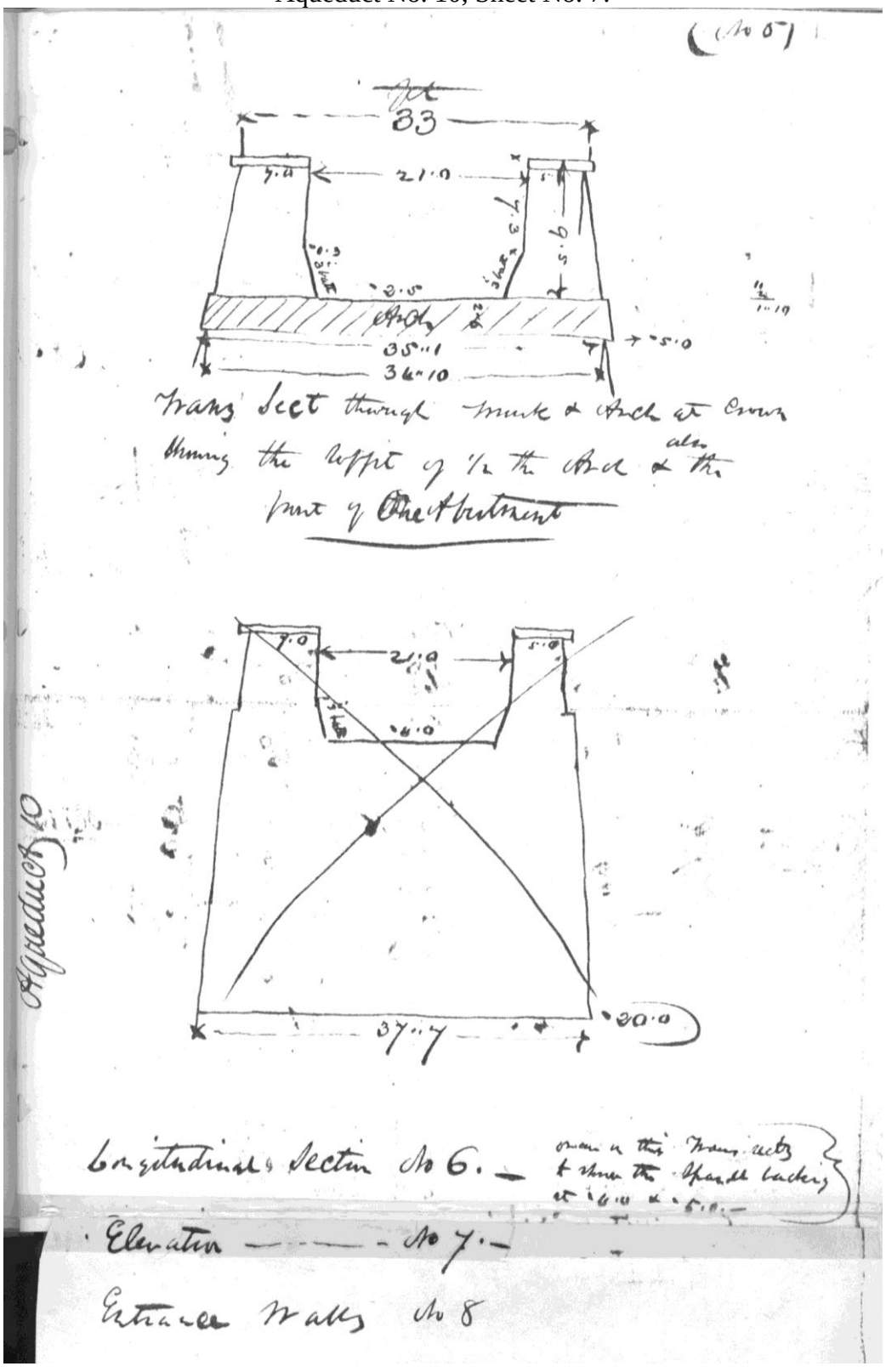


Aqueduct No. 10, Sheet No. 6:



Aqueduct No. 10, Sheet No. 7:

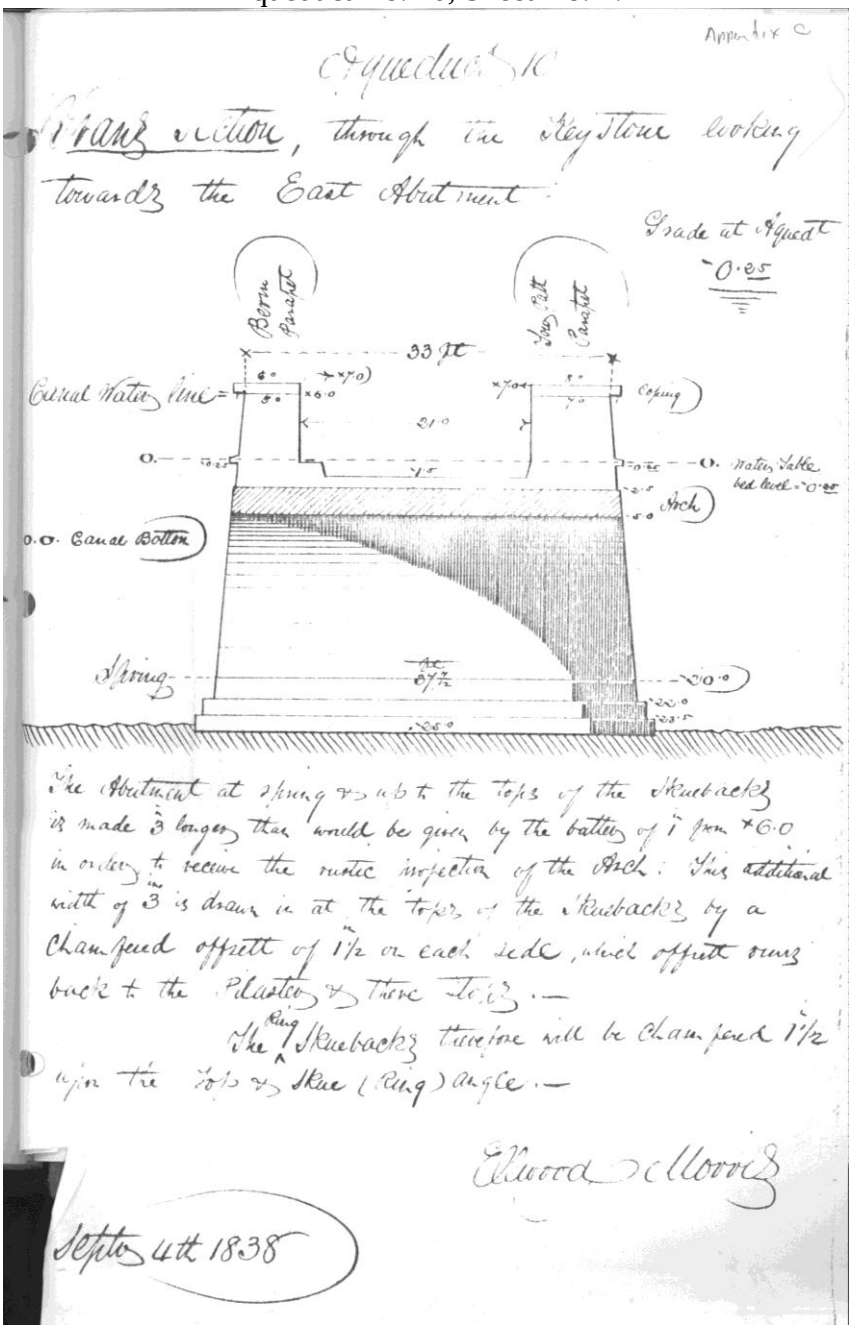


APPENDIX C

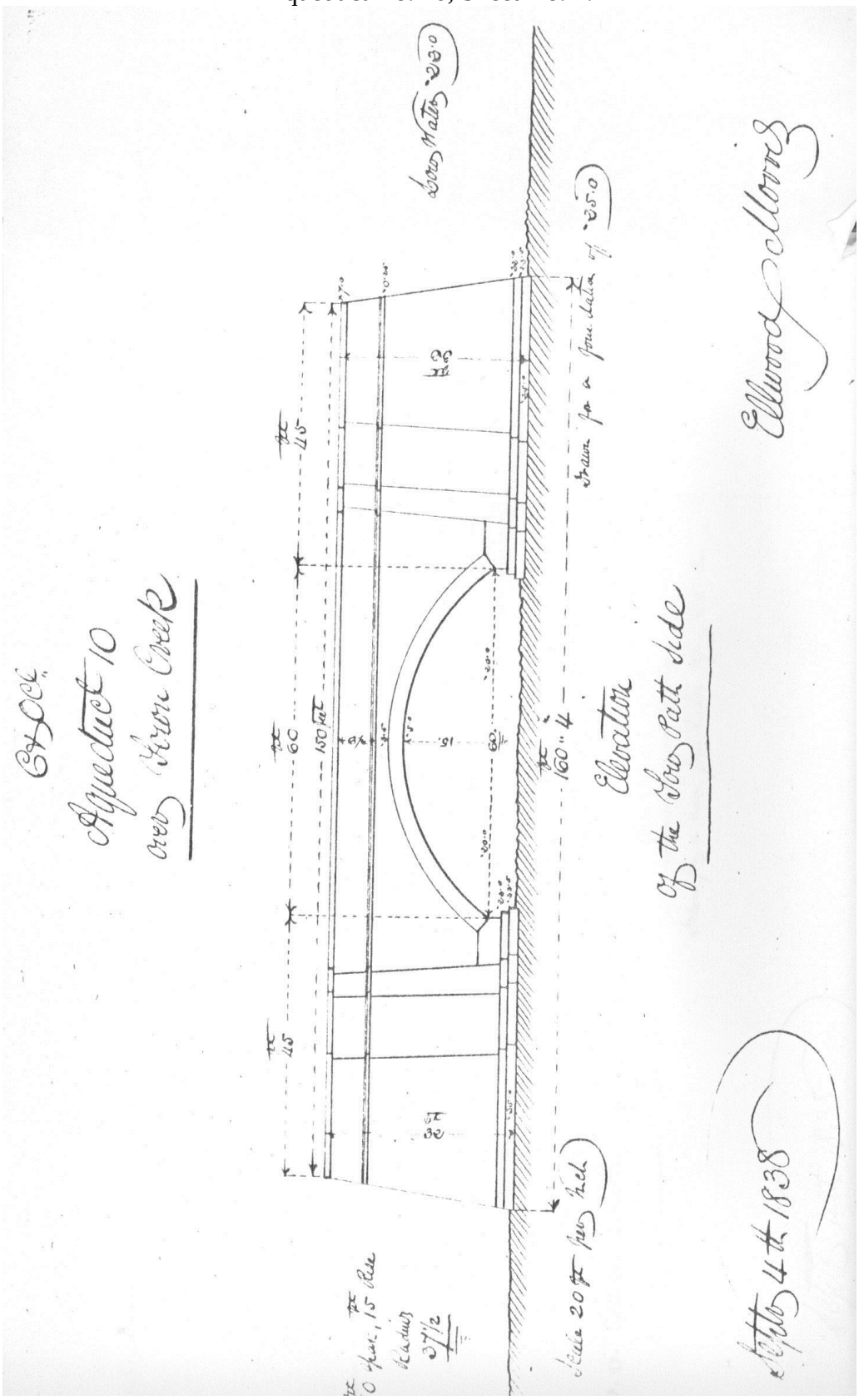
AQUEDUCT NO. 10

Plans prepared and Signed by Ellwood Morris on September 4, 1838.

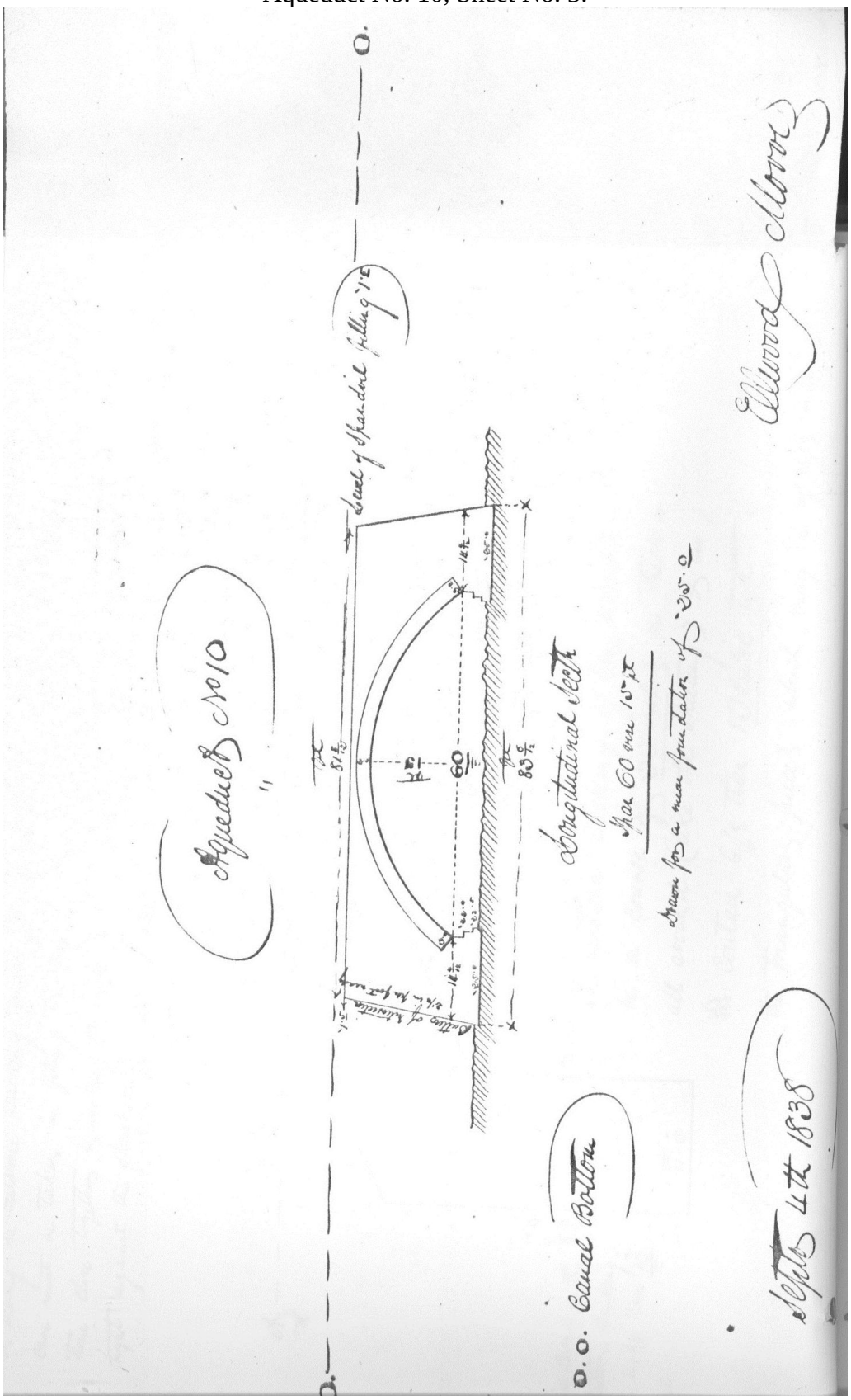
Aqueduct No. 10, Sheet No. 1:



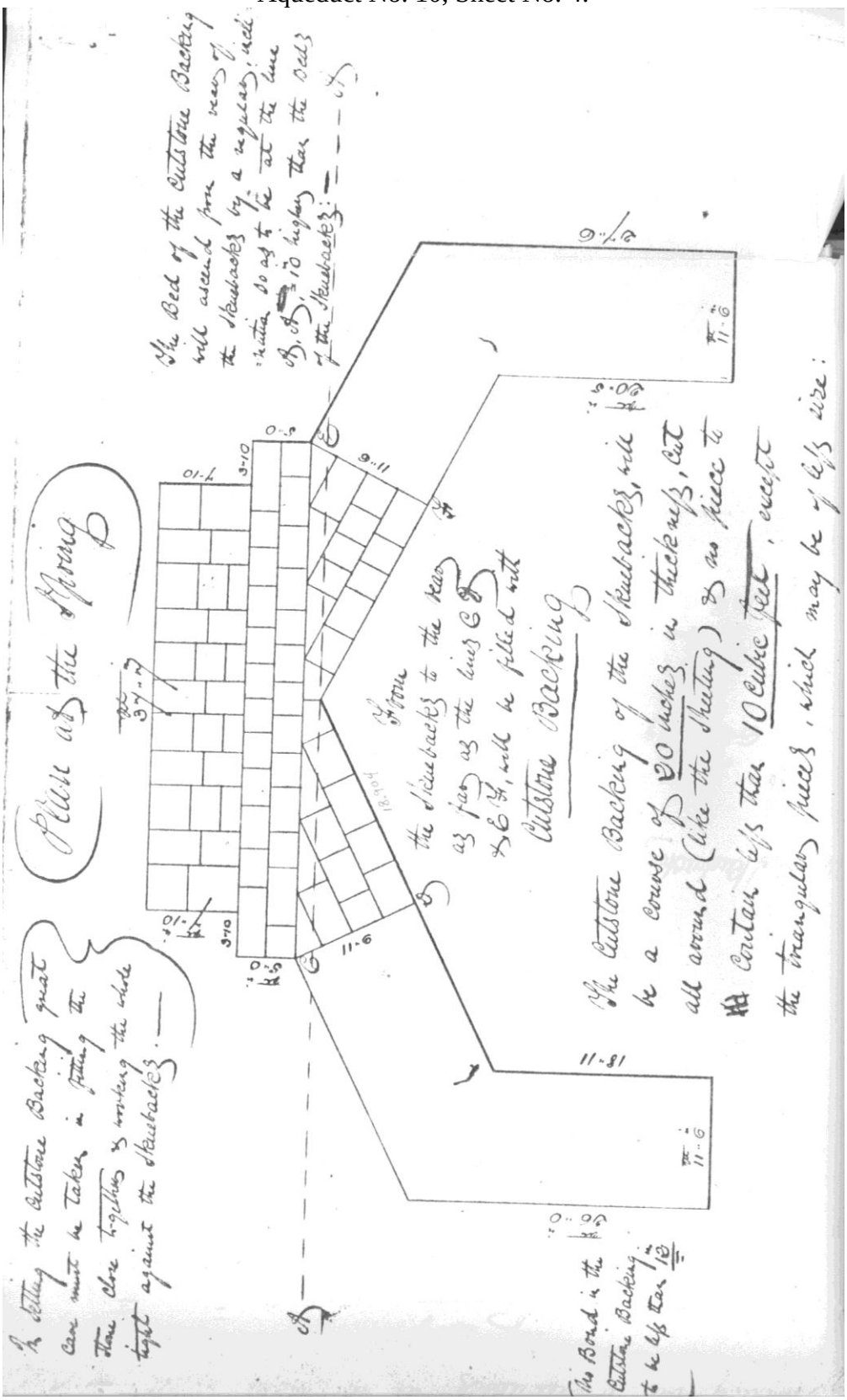
Aqueduct No. 10, Sheet No. 2:



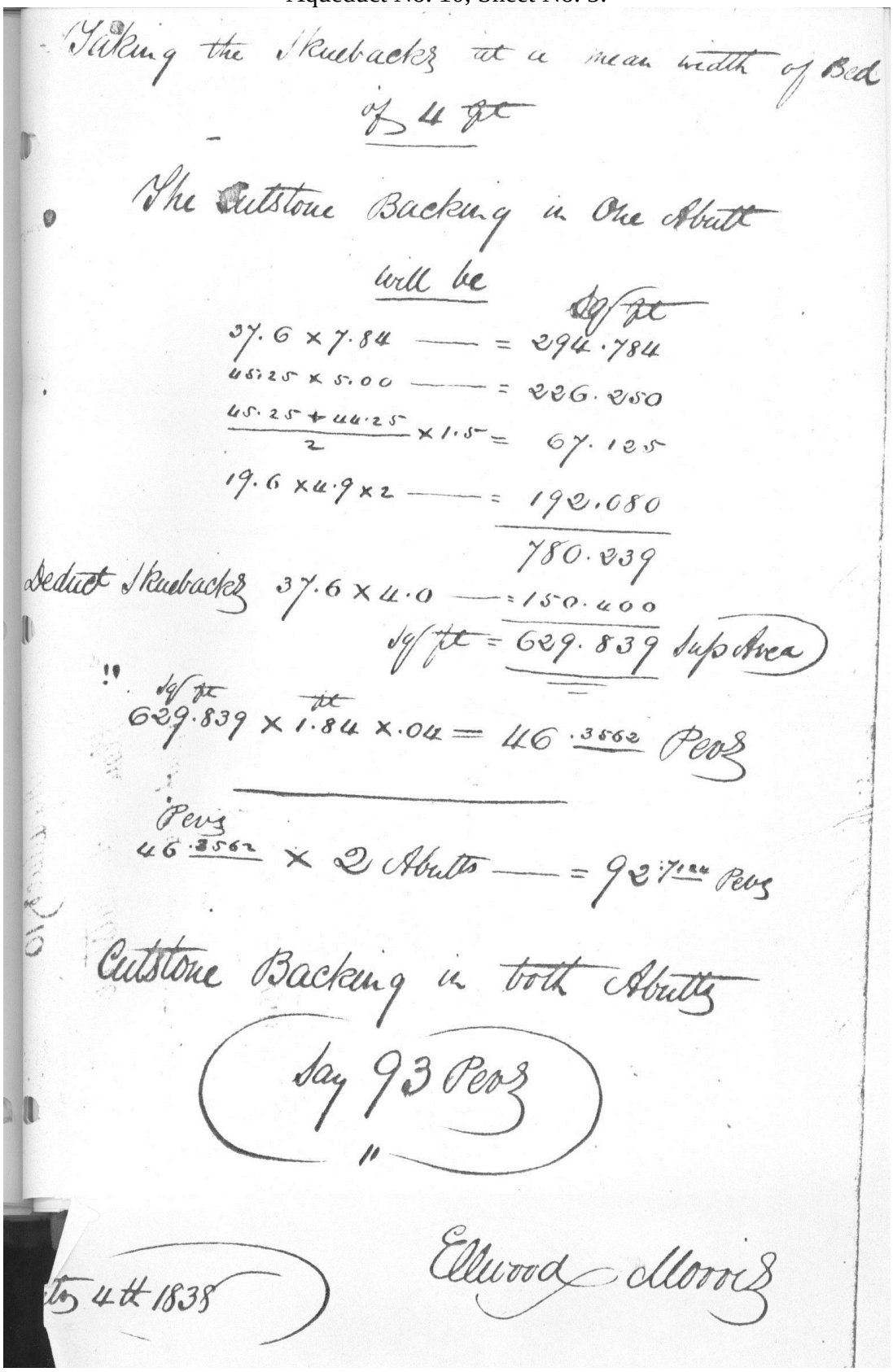
Aqueduct No. 10, Sheet No. 3:



Aqueduct No. 10, Sheet No. 4:



Aqueduct No. 10, Sheet No. 5:



Taking the Skewbacks at a mean width of Bed of 4 ft

The Cutstone Backing in One Abutt will be

Sq ft

37.6 × 7.84 —— = 294.784

45.25 × 5.00 —— = 226.250

$\frac{45.25 + 44.25}{2} \times 1.5$ = 67.125

19.6 × 4.9 × 2 —— = 192.080

780.239

Deduct Skewbacks 37.6 × 4.0 —— = 150.400

Sq ft = 629.839 Sup Area

Sq ft / ft
629.839 × 1.84 × .04 = 46.3562 Perg

Perg
46.3562 × 2 Abutts —— = 92.7124 Perg

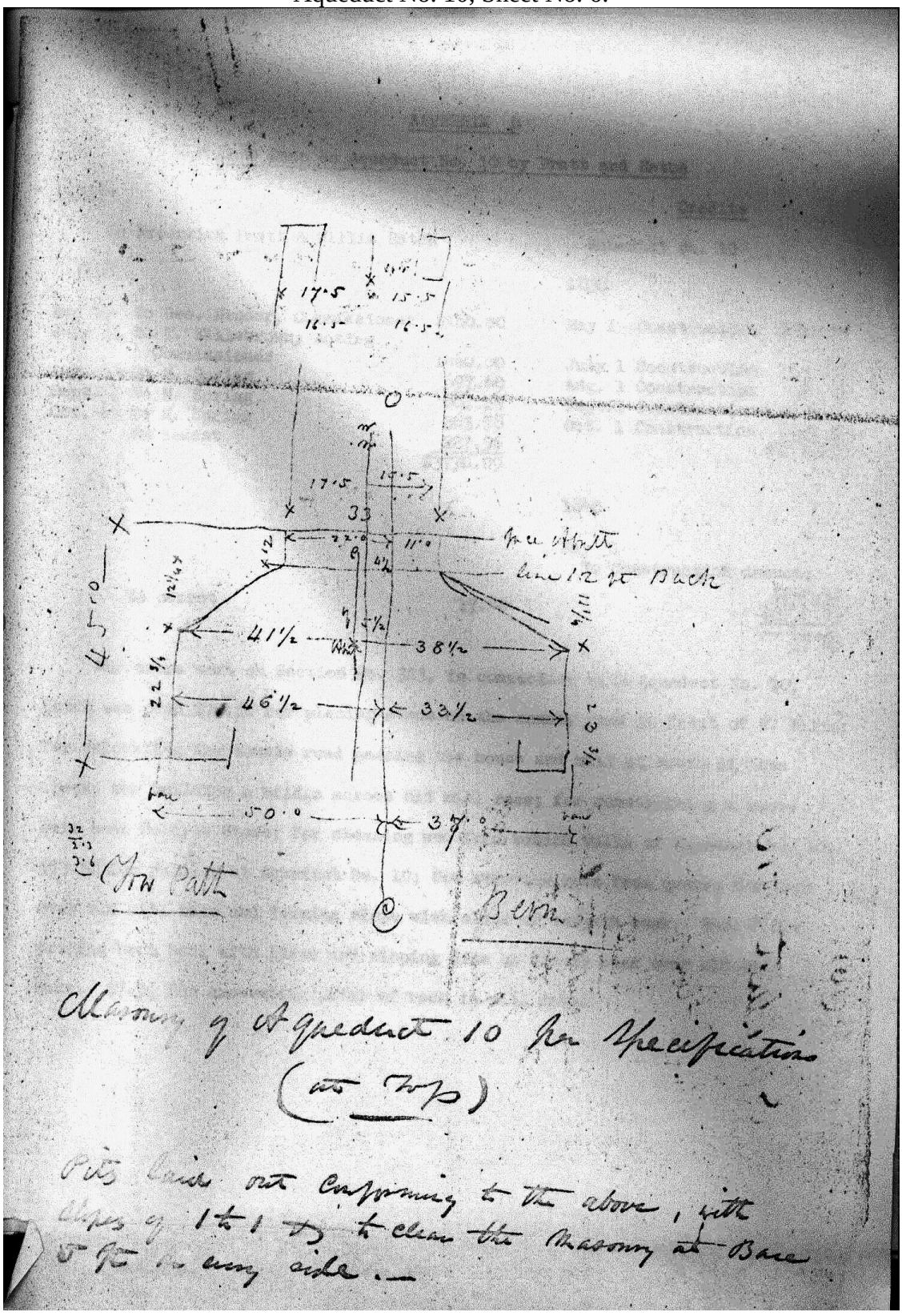
Cutstone Backing in both Abutts

Say 93 Perg

Ellwood Morris

Dec 4th 1838

Aqueduct No. 10, Sheet No. 6:



APPENDIX D

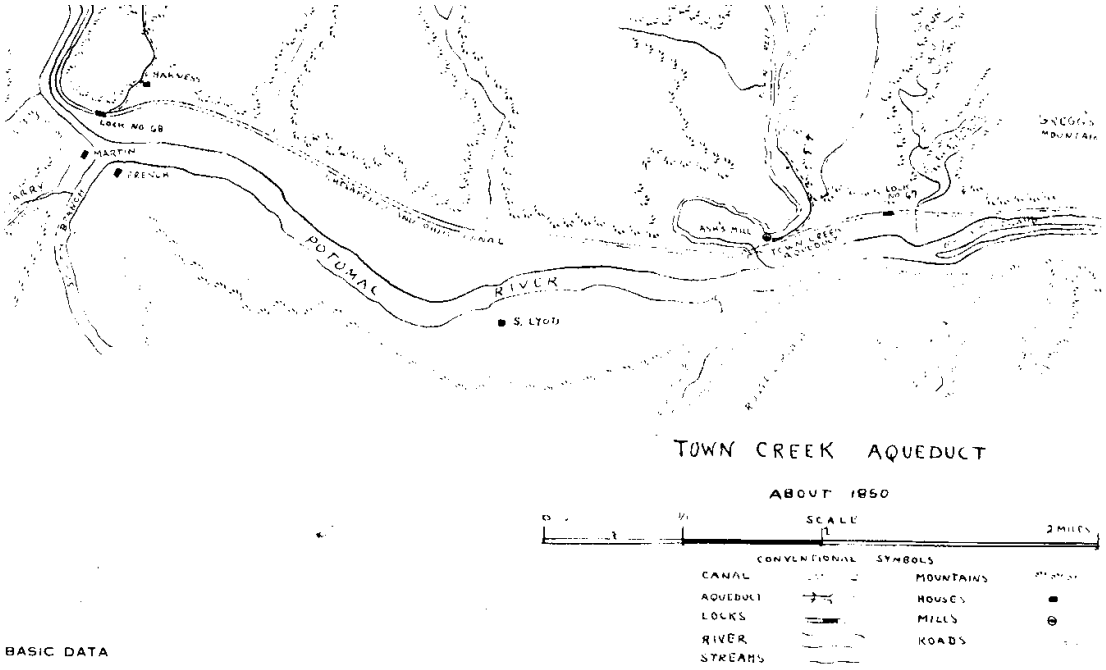
Work Done on Aqueduct No. 10 by Pratt and Hatch

Debits			Credits		
To Frederick Pratt & Willis Hatch			Aqueduct No. 10		
1838			1838		
May 10	To Geo. Bender, Commissioner	$160.00	May 1	For Const	$200.00
July 11	To T. Fillebrown, Acting Comm.	1440.00	July 1	For Const	1800.00
Aug 13	To N. Sprigg	697.60	Aug 1	For Const	871.90
Sep 11	To N. Sprigg	881.15	Sep 1	For Const	1101.53
Oct 12	To N. Sprigg	363.78	Oct 1	For Const	739.18
	To Cement	227.56			$4712.61
		$3770.09			
			1840		
			May 31	For Const	-942.52
	To cement	17.40			$3770.09
					17.40

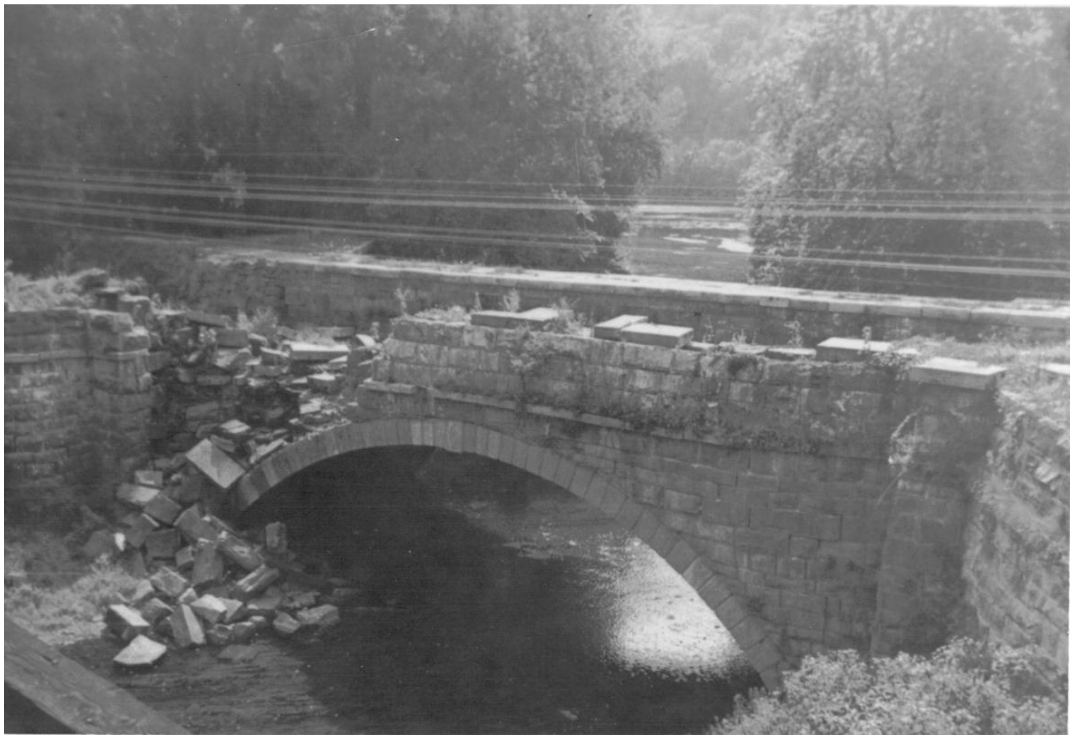
For extra work on Section No. 323, in connection with Aqueduct No. 10, Hatch was paid $70.50 for placing stone on the county road in front of W. Ellis'; for relocating the county road passing the house and mill at mouth of Town Creek; for building a bridge across old mill race; for constructing a waste weir near Selby's Store; for cleaning mud from behind walls of Aqueduct No. 10. $53.52 for puddling at Aqueduct No. 10; for removing rock from quarry for dike over old mill race and forming slope with slate of towpath bank. $48.40 for trimming berm bank with slate and sloping dike on county road over old mill race. $7.50 for excavating point of rock in mill race.

1966 ILLUSTRATIONS
FOR THE HISTORIC STRUCTURE REPORT

1. Location Map—Town Creek Aqueduct.
Prepared by Historian Bearss, October 1966.



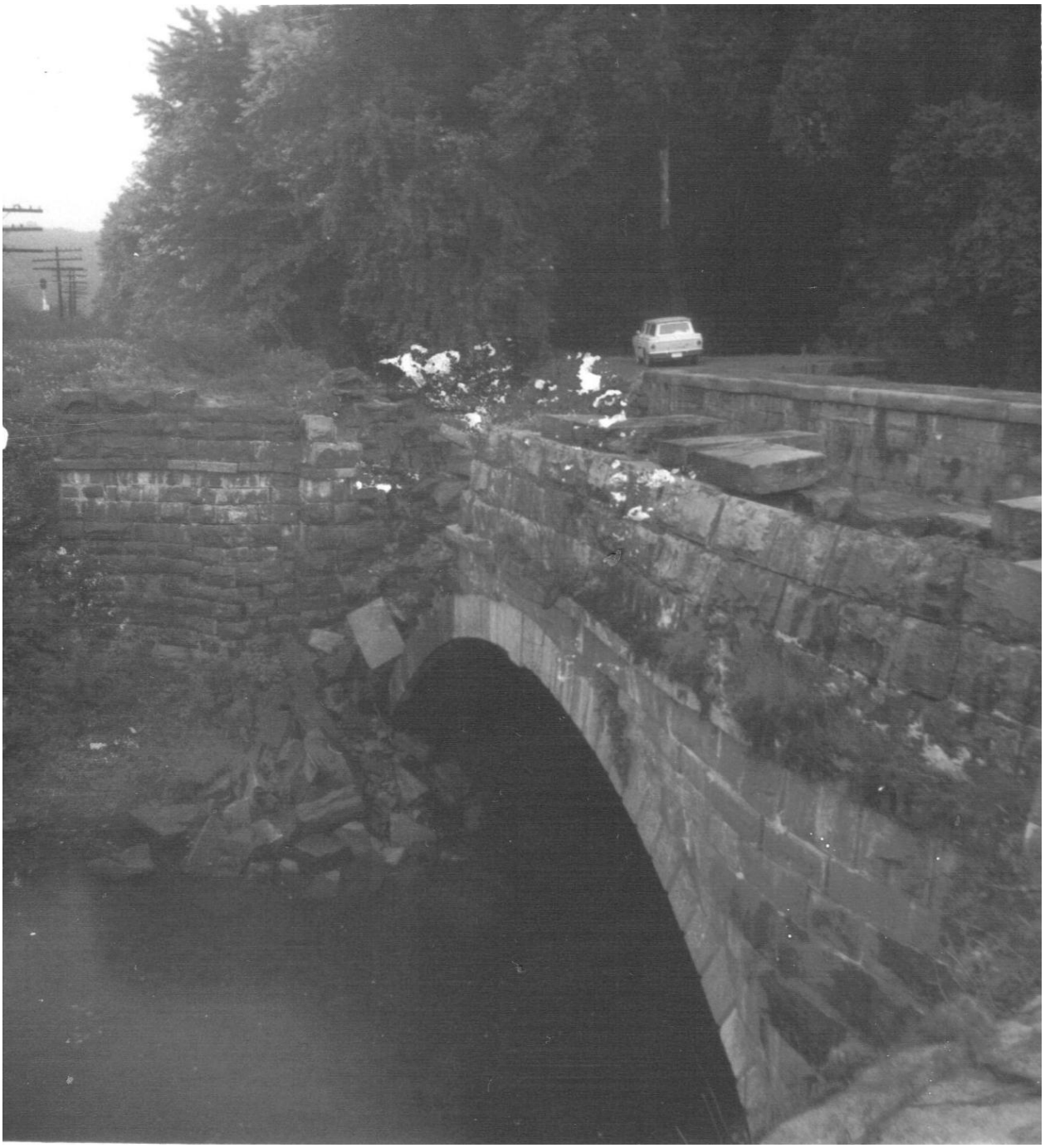
2. Photograph from railroad trestle of berm side of Town Creek Aqueduct.
Photograph supplied by C & O Canal NM.



3. View of canal trunk, looking east, taken from towpath side.
Photograph by E. C. Bearss, Aug. 9, 1966

4. View of towpath side of Town Creek Aqueduct, looking west.
Note broken railing in foreground. Photograph by E. C. Bearss, Aug. 9, 1966

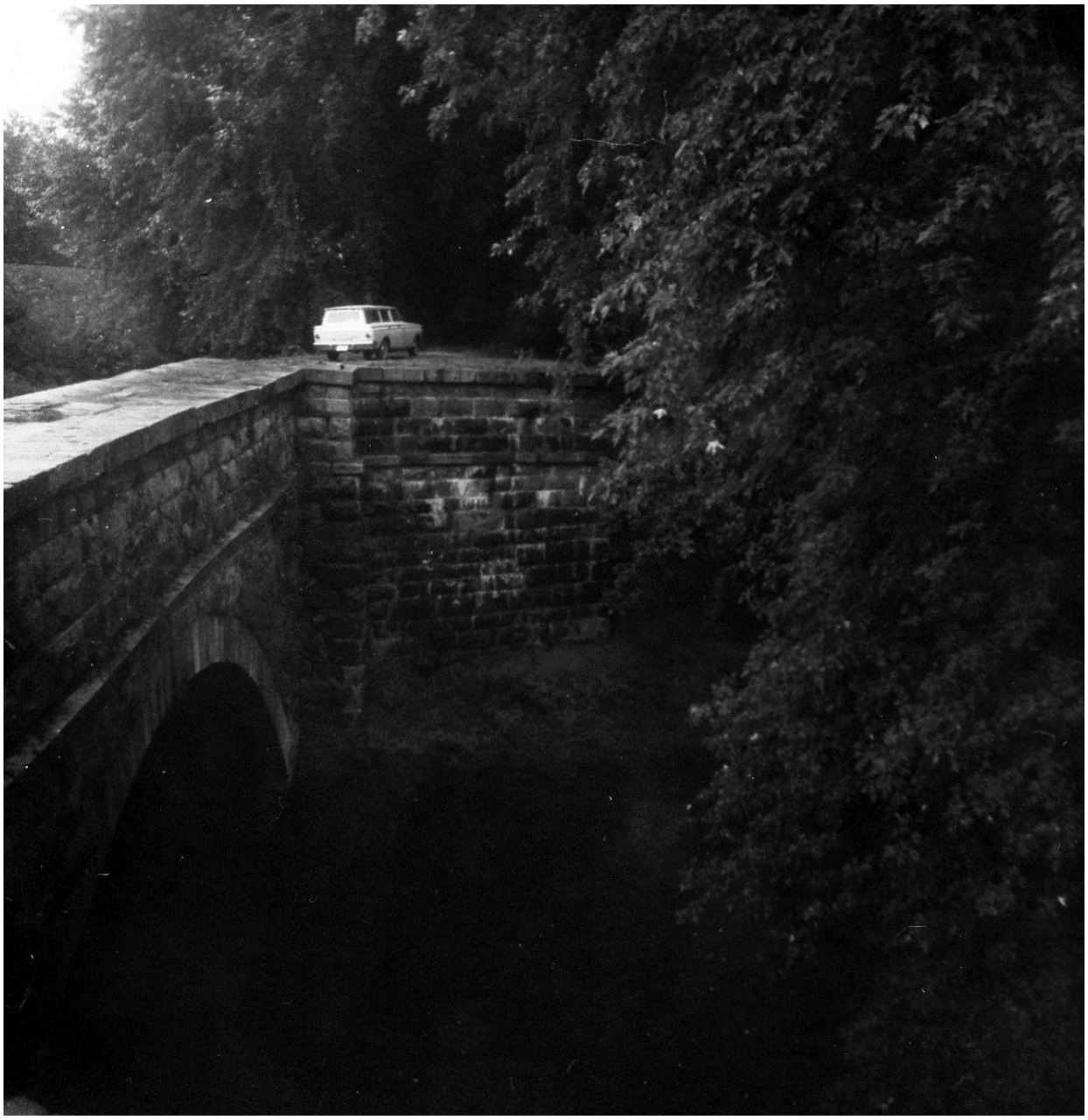
5. View of berm side of Town Creek Aqueduct, looking east.
Note that much of the berm side coping has tumbled. Photograph by E. C. Bearss, Aug. 9, 1966



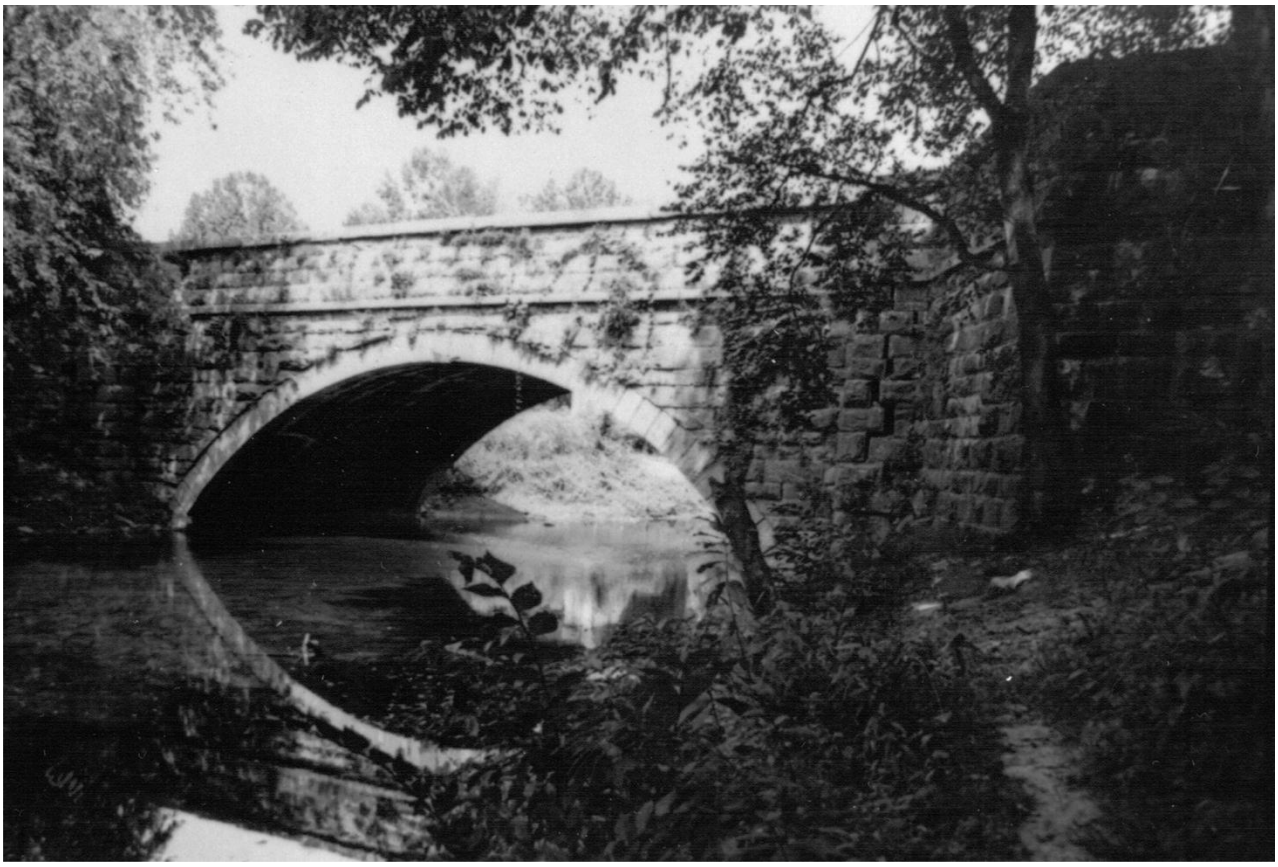
6. View of the trunk of the Town Creek Aqueduct, looking east.
Note that the berm side of the trunk has toppled outward, while the towpath side
of the trunk is intact. Photograph by E. C. Bearss, Aug. 9, 1966.

7. View of the trunk of the Town Creek Aqueduct, looking west.
Photograph by E. C. Bearss, Aug. 9, 1966.

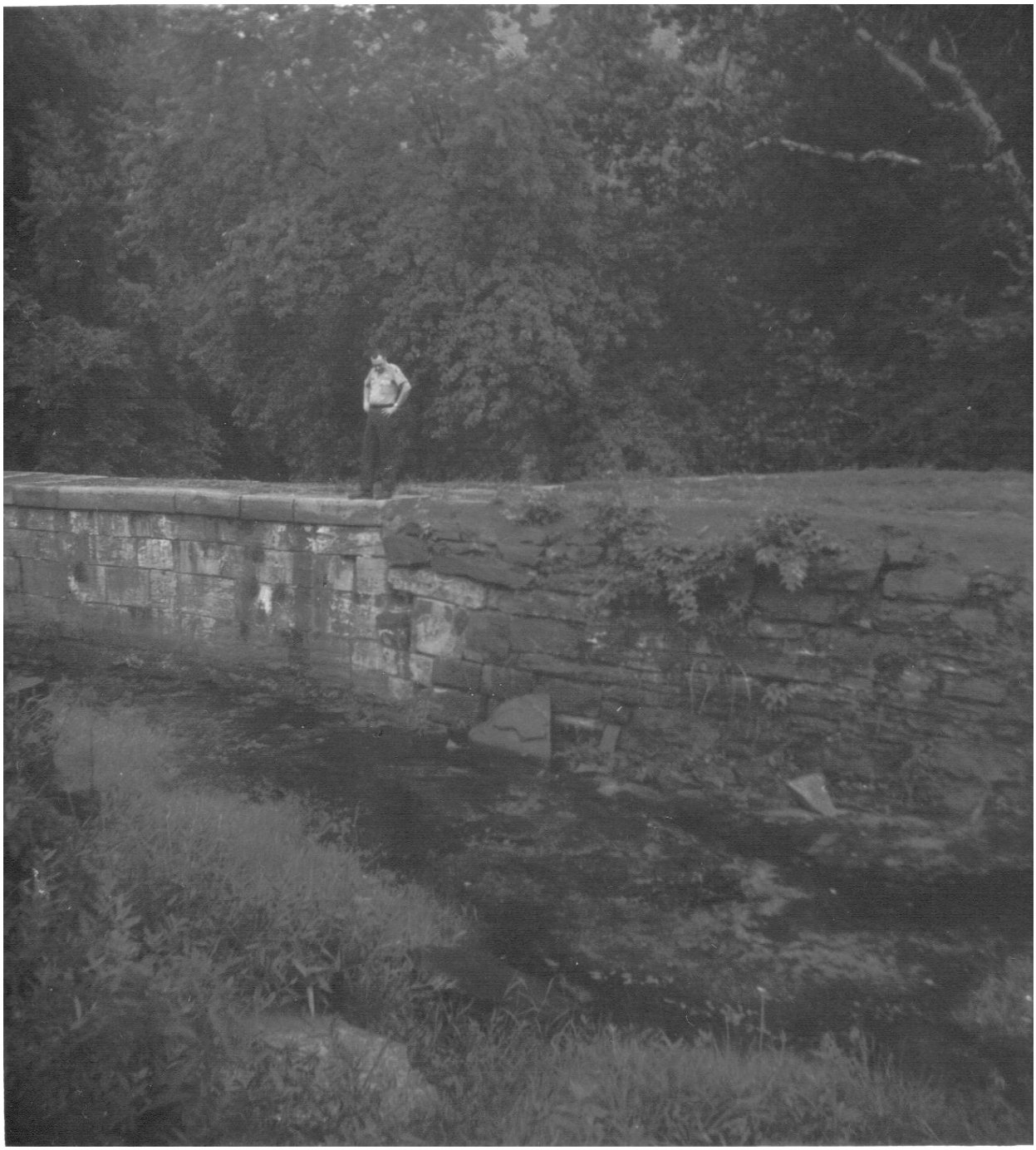
8. View of towpath side of Town Creek Aqueduct, looking east.
Photograph by E. C. Bearss, Aug. 9, 1966.



9. View of towpath side of Town Creek Aqueduct from the east side of the stream.
Photograph supplied by C & O Canal NM.



10. View of west entrance and towpath wing wall of Town Creek Aqueduct.
Supervisory Ranger Bob Bell in the background. Photograph by E. C. Bearss, Aug. 9, 1966.



11. View of towpath side of aqueduct and east wing wall.
Note the deep cracks, where the stones have spread. Photograph by E. C. Bearss, Aug. 9, 1966.

12. View of fallen berm side coping, taken from towpath side of aqueduct.
Photograph by E. C. Bearss, Aug. 9, 1966.

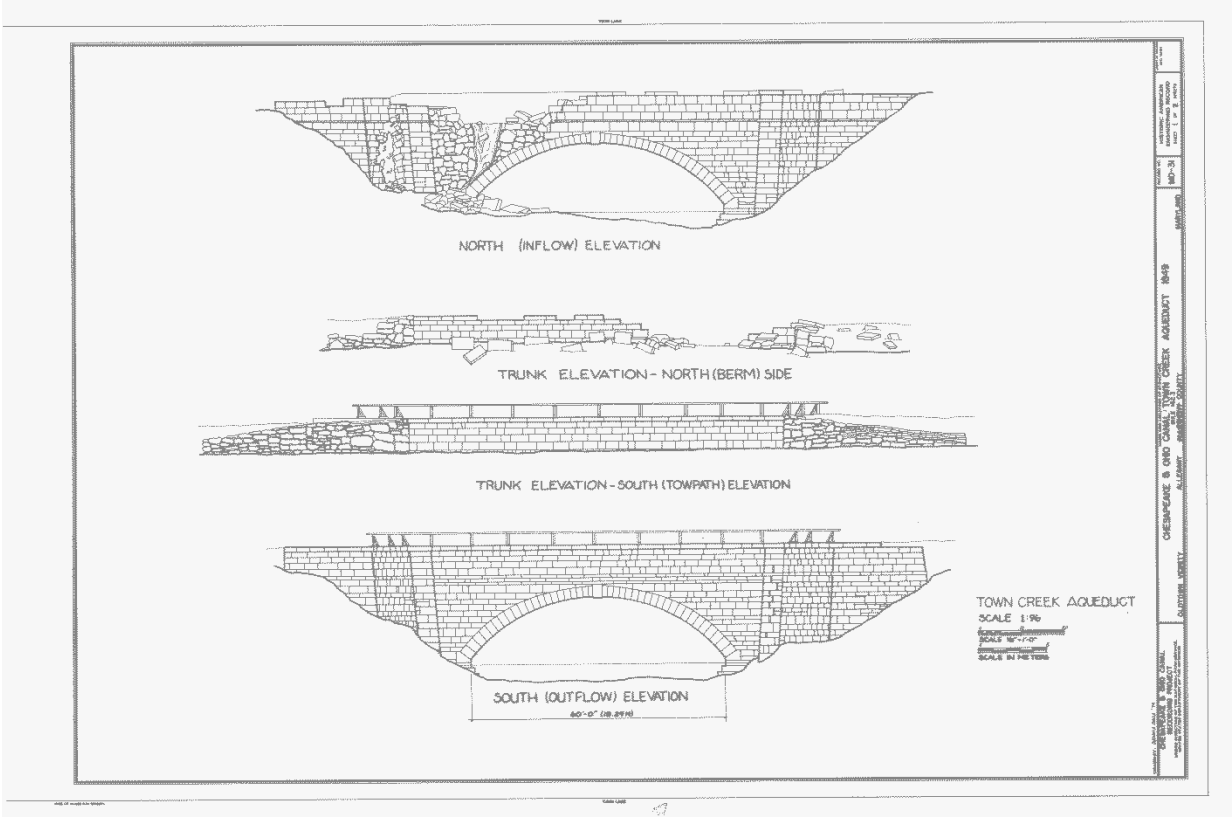
PHOTOGRAPHS AND DRAWINGS
FROM THE HISTORIC AMERICAN ENGINEERING RECORD
DOCUMENTATION 1968

1. Town Creek Aqueduct north face, from the northwest.
Photo by Jack E. Boucher, Historic American Building Survey documentation, 1968.

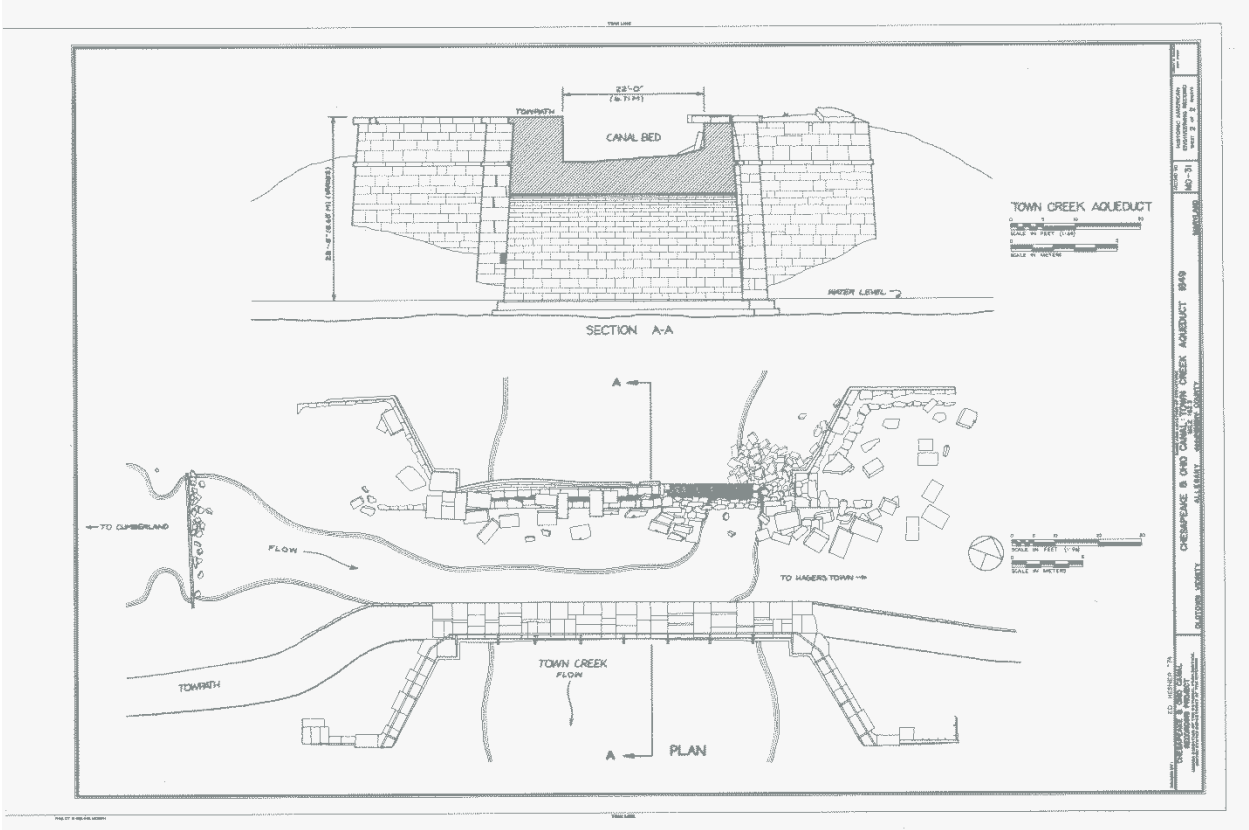
2. Town Creek Aqueduct, north face, from northwest with the northeast abutment.
Photo by Jack E. Boucher, Historic American Building Survey documentation, 1968.

5. Town Creek Aqueduct north face, from the north with the northwest abutment. Photo by Jack E. Boucher, Historic American Building Survey documentation, 1968.

4. Drawings of the Town Creek Aqueduct, north, south, and trunk elevation.

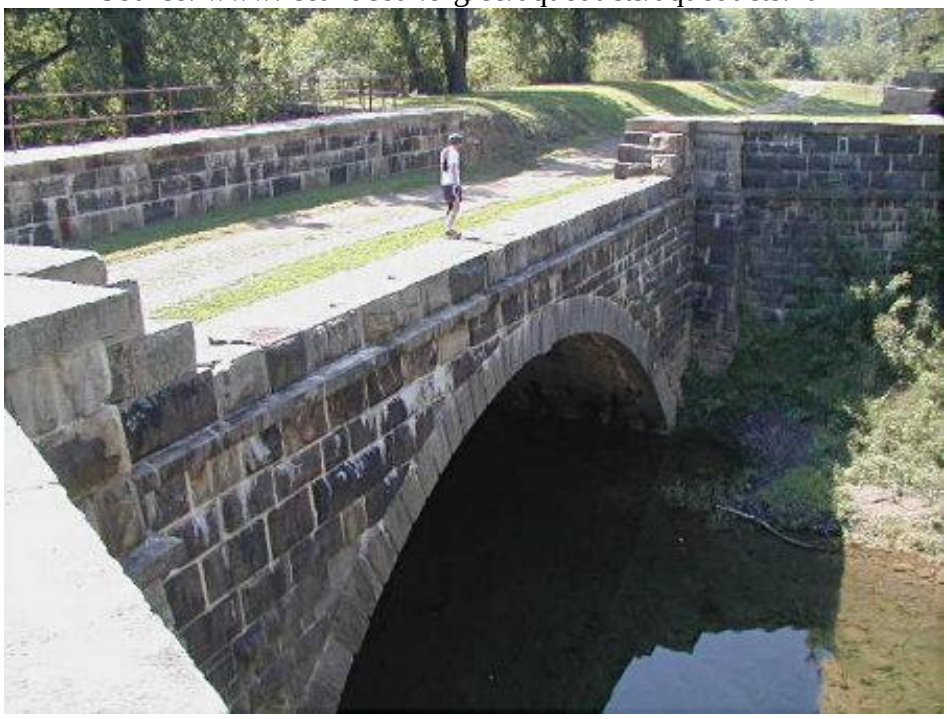


5. Town Creek Aqueduct sectional drawing and plan.

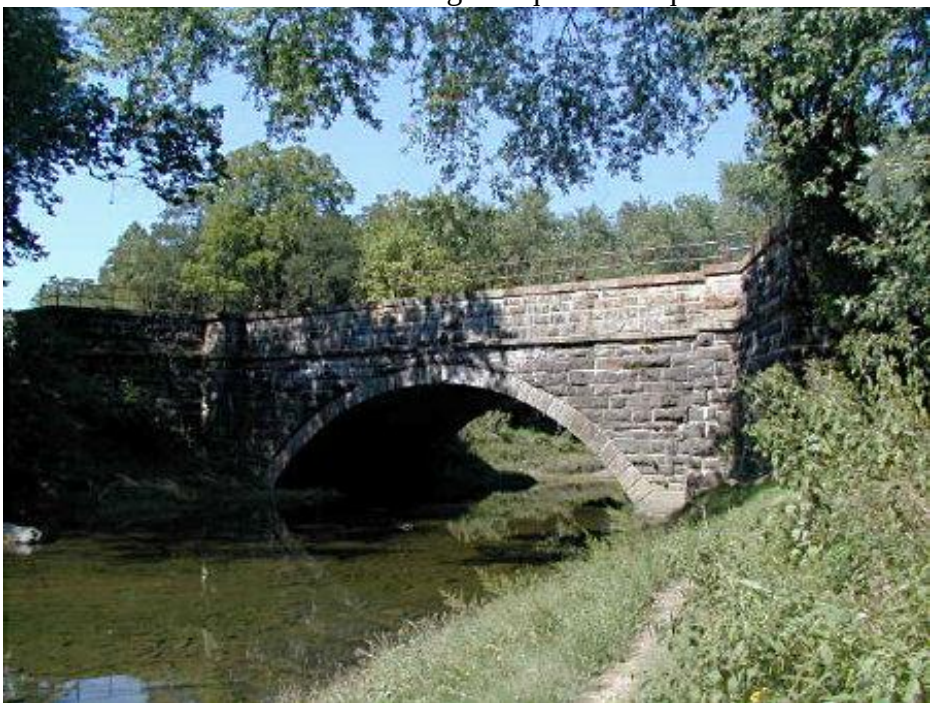


LATER PHOTOGRAPHS

1. Town Creek Aqueduct, berm side, Sept. 1999.
Kelly McCollum is inspecting what remains of the collapsed berm wall.
Photo courtesy of Lawrence Biemiller.
Source: www.iceandcoal.org/co/aqueducts/aqueducts.html



2. Town Creek Aqueduct seen from the river side, Sept. 1999.
Photo Courtesy of Lawrence Biemiller.
Source: www.iceandcoal.org/co/aqueducts/aqueducts.html



3. Town Creek Aqueduct looking through the arch toward the Potomac, ca. 2000. Photo courtesy of Rick McMullan. Source: www.mcmullans.org/canal.

4. Town Creek Aqueduct, towpath side. Date unknown.